



Edd Clark & Associates, Inc.

Environmental Consultants

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Mr. Stephen R. Krautheim
Project Engineer
Novato Sanitary District
500 Davidson Street
Novato, CA 94945

**Corrective Action Plan/Remedial Action Plan
For Source Removal
Novato Sanitary District
500 Davidson Street
Novato, California**

Dear Mr. Krautheim:

Please accept this as Edd Clark & Associates, Inc.'s (EC&A's) Corrective Action Plan/Remedial Action Plan (CAP/RAP) for the Novato Sanitary District (NSD) Wastewater Treatment Facility located at 500 Davidson Street (site) in Novato, California (Figure 1). Site work is being performed at the request of the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) because of a release of fuel hydrocarbons (FHCs) from a former underground storage tank (UST) for diesel and a former diesel-product line. The purpose of the corrective action work proposed in this CAP/RAP is to remove FHC-impacted soil and groundwater to the extent practical in the area of effluent trunk line 3 and the influent junction box (Figure 2) where a release occurred in the former diesel-product line, and free product was observed in extraction well PE-1 (Figure 2). Remediation will be performed during the sewer-system-upgrade construction project planned for the summer of 2007.

Following their review of EC&A's December 14, 2006 *Report: Monitoring Well Installation/Initial Sampling Event*, the SFBRWQCB requested a Feasibility Study/Corrective Action Plan (FS/CAP) for any proposed remediation at the site, as well as a draft notification/fact sheet and mailing list for interested parties. However, after subsequent discussion with the SFBRWQCB, and in a letter dated March 20, 2007 (Appendix A), the SFBRWQCB modified their request, requiring only the completion of a CAP that included a RAP, eliminating the requirement for a Feasibility Study, and modifying the notice of public comment period requirements. The SFBRWQCB required evidence that interested parties within 500 feet (ft) of the site are notified and provided an opportunity to comment on the proposed corrective action work. The SFBRWQCB modified the CAP and public notice requirements because source removal during construction activities is the only feasible remediation option for the site and construction work will necessarily result in the removal of FHC-impacted soil and groundwater. A copy of this CAP/RAP will be submitted to the SFBRWQCB for their review and approval.

BACKGROUND

Site Description

The Wastewater Treatment Facility is located at the end of Davidson Street in Novato, California. Open fields and wetlands are south and southeast of the site. The Novato Corporation Yard is west of the site. Residences are about 800 ft north of, and 600 ft west of, the site. The Wastewater Treatment Facility consists of an administration building, multiple aboveground sewage-treatment tanks, and effluent-treatment ponds. There are numerous underground process pipes, utilities and sumps at depths up to approximately 18 ft. An above-ground storage tank (AST) for diesel was installed when the UST for diesel was removed in October 1998, and a product-extraction well (PE-1) was installed in the location of the former product-line release when the area was excavated in September 1998 (Figure 2).

The ground surface is generally paved with asphalt or concrete. The Novato Quadrangle, United States Geological Survey Map (Figure 1), shows that the elevation of much of the site is less than 10 ft above sea level, and the apparent down-gradient direction is toward the south-southeast. Novato Creek is about 1200 ft south of the site and generally flows to the southeast.

PREVIOUS SITE INVESTIGATIONS

September 1998 Leaking Product-pipe Excavation

As part of the UST removal/upgrade project completed in 1998, product lines from the former UST to the former fuel dispenser and to the wet-weather effluent pump station were purged, capped and cut. On September 8, 1998, a fuel leak was observed in the suction fuel line to the former dispenser approximately 50 ft west of the former UST (Figure 2). The fuel line was buried approximately 4.5 ft below ground surface (bgs). Barbara Zett of the County of Marin Office of Waste Management (CMOWM) was notified and inspected the leaking pipe. Able Maintenance Inc., removed fuel-contaminated soil to about 13.5 ft bgs in an excavation that measured about 13 ft wide and about 16 ft long (Figure 2 and Appendix B).

Groundwater was observed entering the excavation at 13 ft bgs. Floating product was observed on the water; a band of apparently contaminated, discolored soil was observed at 12 ft bgs. On September 11, 1998, approximately 250 gallons of FHC-contaminated water with globules of floating product were pumped from the excavation and disposed of by Ecology Control Industries. Reportedly, the excavation was immediately west of the lowest point in the treatment system where all the underground sewage lines converge for sewage collection and distribution at approximately 14 ft bgs in the influent junction box. The process piping is in gravel trenches. Because groundwater was entering the excavation from only one point on the south wall and one point on the east wall, it was speculated that the water in the excavation was not actual groundwater, but that water trapped in the gravel-filled trenches containing the process piping was draining into the excavation.

Soil sample S-2 was collected from the south sidewall of the excavation at 9.0 ft bgs; water sample 2981-3 was collected from the water in the excavation on September 11, 1998, after the excavation was dewatered. Another soil sample, S-1, was collected at 4.5 ft bgs next to the bend in the fuel line that runs to the wet-weather effluent pump station. Soil samples were analyzed for total petroleum hydrocarbons (TPH) as diesel (d) and benzene, toluene, ethylbenzene and xylenes (BTEX); the water sample was analyzed for TPHd only. FHCs were not detected in sample S-1. TPHd at 5800 milligrams per kilogram (mg/kg), toluene at 12,000 mg/kg, ethylbenzene at 80,000 mg/kg and xylenes at 460,000 mg/kg were detected in sample S-2. TPHd at 16,000,000 micrograms per liter ($\mu\text{g/l}$) was detected in the water sample. Documents pertaining to the excavation are presented in Appendix B.

Following the collection of samples from the excavation, a product extraction well (PE-1) constructed of 8-inch-diameter PVC was installed in the excavation directly above line #3 (the main effluent trunk line) in the trench backfill material. The well is screened from 11 ft to 13.75 ft bgs with 0.125-inch slots. The excavation was backfilled with drain rock on September 11, 1998.

October 1998 UST Removal

On October 21, 1998, one 6000-gallon fiberglass UST for diesel was removed from the site by Able Maintenance, Inc. One soil sample was collected in native soil from the east side of the UST excavation and analyzed for TPHd and BTEX. Concentrations of TPHd and/or BTEX were not detected. Ms. Zett from the CMOWM inspected the UST removal and reported that the UST appeared intact, was originally set in gravel backfill, there was no evidence of leakage, and groundwater was not present in the UST excavation.

August 1999 Soil and Groundwater Investigation

The SFBRWQCB directed the NSD to conduct a soil and groundwater investigation in the locations of the former UST, UST dispenser (located approximately 180 ft northwest of the former UST), and product-line leak. EC&A personnel directed the installation of seven soil borings (SB-1 through SB-7) in the vicinity of these locations (Figure 2). Logs of all soil and well borings drilled for this site by EC&A are included in Appendix C.

Soil

FHCs were detected in soil in the area of the former UST for diesel (SB-1) and former product-line excavation (SB-3) at 2100 mg/kg and 1300 mg/kg, respectively. Trace concentrations of TPHd (1.7 mg/kg) were detected in SB-2, which is located approximately 33 ft south of SB-1. FHCs were not detected in soil in the location of the former dispenser (SB-7), or from SB-4, SB-5 and SB-6, which are located south, west and north, respectively, of the former leaking-product-pipe excavation (Figure 2 and Table 1).

Groundwater

FHCs were detected above trace concentrations in groundwater 10 ft south of the former UST for diesel (SB-1), and about 23 ft east of product-extraction well PE-1 (SB-3). Free product (0.5 inches) was observed in extraction well PE-1 and in soil and groundwater collected from SB-3, which was drilled into the backfill material of the effluent pipe connecting the influent junction box to the

influent pump house. TPHd at 100 µg/l and 45,000 µg/l was detected in grab-groundwater samples collected from SB-1 and SB-3, respectively. BTEX compounds, if detected, were below 1.0 µg/l, even in samples containing free product (Table 2).

Groundwater sample analytical results and observation of free product during the August 1999 soil and groundwater investigation, and from the September 1998 product-line excavation indicate that there was a significant release of diesel fuel to groundwater in the location of the former product-line excavation. However, the release appears to be confined to the main influent trunk line and influent pump-house-line trenches, close to their union with the influent junction box. The 1998 excavation was directly above trunk line #3, immediately west of the influent junction box. Because it is the lowest point in the sewage-collection system, and as described in EC&A's October 1999 *Soil and Groundwater Investigation Report*, the surrounding native soil is less permeable than the trunk-line backfill material, free product and FHC-contaminated groundwater is likely to remain within the trunk-line/junction-box trenches.

Sensitive Receptor Survey

On January 14, 2000, EC&A personnel performed a sensitive receptor survey in the general vicinity of the site. The survey was conducted by interviewing NSD personnel and visually inspecting the area within 500 ft of the location of the former UST and the product-line leak for water wells, vaults and surface water. The search radius, which was verbally approved by the SFBRWQCB, was based on the soil boring soil and grab-groundwater sample results from the August 1999 soil and groundwater investigation.

- Where accessible, EC&A personnel monitored the underground vaults with an organic vapor analyzer; no vapors were detected.
- No private, commercial or municipal water wells were identified within 500 ft of the site. NSD personnel reported that the site and surrounding area is served by the North Marin Municipal Water District.
- Open fields and apparently seasonally or tidally influenced wetlands surround the site to south and southeast. No surface water was observed at the time of the inspection.
- Man-made surface impounds within the survey area include four concrete-lined treatment ponds about 125 ft south of extraction well PE-1 that are used for holding treated water, sewage overflow and backwash. A pipeline for discharging treated water into San Francisco Bay is south of the holding ponds. There are two unlined overflow-sludge ponds about 200 ft southeast of PE-1.
- Underground process piping in the survey area included five main effluent trunk sewage lines in the area of the August 1999 soil and groundwater investigation (Figure 2). These trunk lines drain into the influent junction box, the low point in the system. From the influent junction, sewage flows into the influent pump house, 22 ft to the east. NSD personnel estimated the drop from the junction box to the pump house at 0.1 ft. The bottom of the junction box is about 18 ft bgs. The crowns of trunk lines #1 and #2 enter the junction box at about 12.5 ft bgs, the crown of line #3 enters the junction box at about 13.75 ft bgs, and the crowns of lines #4 and #5 enter the junction box at about 16 ft bgs.

October 1999 - September 2003 Product/Diesel Fuel-contaminated Water Removal

From October 1999 through September 2003, approximately 4870 gallons of diesel-fuel contaminated water were extracted from PE-1. Seven gallons of product were also removed during this time. Depth to water (DTW) below the top of well casing (TOC) in PE-1 has ranged from 11.52 ft (February 2000) to 12.89 ft (September 8, 2000). Table 3 shows the dates of the removal events, the volume of contaminated water removed, and DTW measurements.

June 2000 - September 2003 Extraction Well Sampling and Analysis

Extraction well PE-1 was sampled six times between June 8, 2000 and September 23, 2003. TPHd concentrations ranged from 16,000 µg/l (September 8, 2000) to 620,000 µg/l (September 23, 2003). BTEX compounds have not been detected in groundwater from PE-1. In general, the TPHd concentrations measured in PE-1 increased until the September 2003 monitoring event. Seven polynuclear aromatic hydrocarbons (PNAs), which are components of diesel fuel, were detected in groundwater from PE-1 in April 2002 at a maximum concentration of 48 µg/l (1-methyl naphthalene). PNAs were not detected in the September 2003 sampling event. Extraction well groundwater sample analytical results are summarized in Tables 4 and 5.

August 2006 Groundwater Investigation

The purpose of the groundwater investigation was to evaluate whether water with elevated TPHd concentrations and product apparently entrained in the trunk-line backfill material in the vicinity of the influent junction box and PE-1, and TPHd-impacted groundwater in the vicinity of the former UST, have migrated away from these areas. To assess the potential for the migration of TPH-impacted groundwater and/or product, on August 24 and 25, 2006, EC&A directed the installation of groundwater monitoring wells MW-1, MW-2 and MW-3 to depths of 20 ft, 21 ft and 20 ft, respectively.

Soil samples collected from the well borings were analyzed for TPHd and BTEX by Analytical Methods SW8015C/8021B. Seven soil samples (two from MW-1 and MW-2 and three from MW-3) were submitted for laboratory analyses. TPHd was detected in four of the seven soil samples at concentrations ranging from 1.2 mg/kg (MW-1d5.5) to 160 mg/kg (MW-3d8.0). Minor concentrations of ethylbenzene and xylenes were detected in sample MW-3d8.0. Results of analyses of soil samples from borings are summarized on Table 1.

September and December 2006 Groundwater Monitoring

On September 22, 2006 and December 28, 2006, EC&A personnel measured DTW in MW-1, MW-2 and MW-3 and collected groundwater samples from MW-1, MW-2, MW-3 and PE-1. DTW ranged from 8.01 ft (MW-1, December 2006) to 13.02 ft (MW-3, September 2006); the groundwater-flow directions were calculated to be N32°E on September 22, 2006, and N43°W on December 28, 2006 (Table 6). Figure 3 is a groundwater elevation map for December 28, 2006.

All groundwater samples were analyzed for TPHd and BTEX by Analytical Methods SW8015C/8021B. None of the analytes tested for were detected in groundwater samples collected from MW-1, MW-2 and MW-3. TPHd was detected in PE-1 at 9200 µg/l and 3000 µg/l in September and December 2006, respectively. In both sampling events, the analytical laboratory

characterized the TPHd result in PE-1 as "aged diesel? is significant." In December 2006, xylenes were detected in MW-2 at 0.88 µg/l.

Analytical results for fuel hydrocarbons in groundwater samples from monitoring and extraction wells are summarized in Table 4. Results for previous analysis for PNAs in product extraction well PE-1 are summarized in Table 5.

HYDROGEOLOGY

Generally, subsurface materials encountered in the soil borings drilled at the site in August 1999 consisted of a layer of clayey to sandy alluvium/bay mud that overlies silty sandstone bedrock. Depth to bedrock was 10.5 ft in SB-1, 13 ft in SB-2, 19.5 ft in SB-3, 13.5 ft in SB-4, 15 ft in SB-5, 18 ft in SB-6, and 12 ft in SB-7 (Appendix C).

In SB-1, the alluvium consisted of sandy clay/clayey sand overlying silty sand. In SB-2, the alluvium consisted of sandy clay overlying clayey sand overlying silty sand. SB-3 was drilled in the backfill material of the pipe connecting the influent junction box with the influent pump house. Clayey sand with gravel was from below the asphalt paving to about 15 ft bgs, followed by clayey gravel backfill to about 19 ft bgs. In SB-4, bedrock was at about 12 ft bgs, and the alluvium consisted of clayey sand overlying silty sand. In SB-5, there was about 4.5 ft of gravelly fill over the alluvium, which consisted of sandy clay overlying sandy silt. In SB-6, there was about 4.5 ft of gravelly fill over the alluvium, which consisted of sandy clay overlying silty sand. In SB-7, the alluvium consisted of sandy clay overlying gravelly silty sand.

In MW-1, 5.0 ft of fill overlay 8.0 ft of silty sand/sandy silt alluvium. In MW-2, 7.0 ft of fill overlay 8.0 ft of clayey-gravel and clayey-sand alluvium. In MW-3, about 6.0 ft of fill overlay 8.5 ft of silty-sand/sandy-silt alluvium. In the three wells, sandstone bedrock was 13 ft bgs in MW-1, 15.5 ft bgs in MW-2, and 14.5 ft bgs in MW-3.

Groundwater

Surface topography in the area of investigation indicates that groundwater probably flows toward the south (Figure 1). In September and December 2006, the groundwater-flow direction was toward the northeast and northwest, respectively (Figure 3 and Table 6).

In August 1999, groundwater was encountered at 13 ft bgs during drilling of SB-3, which was advanced into backfill near the influent junction box. No obvious water-producing zone or free water was encountered in the other borings. Groundwater seeped into these soil borings very slowly. SB-1, SB-4, SB-5, SB-6 and SB-7 were open overnight. It appeared that groundwater was entering the borings at about 10 ft bgs, at the interface between the clayey sand/silty clay and silty sand. DTW in SB-2, SB-6 and SB-7, measured after they were open for about 24 hours, was 10.18 ft, 9.25 ft and 10.5 ft, respectively.

In August 2006, obvious groundwater was not encountered during drilling of the monitoring wells. In MW-1, moist to wet silty sand was from about 11 ft to 13 ft bgs. In MW-2, a moist poorly graded sand was from about 11 ft to 13.5 ft bgs. In MW-3, silty sand was from about 9.5 ft to 14.5 ft bgs. There was about one inch of water in MW-2 and MW-3 after the wells were completed. Groundwater appeared to be seeping into MW-2 and MW-3 at a rate of about 0.5 inches per hour.

DTW below TOC in the monitoring wells ranged from 10.65 ft to 13.02 ft on September 22, 2006, and from 8.01 ft to 12.73 ft on December 28, 2006. DTW in well PE-1, the extraction well installed by NSD in the product line excavation, ranged from 11.52 ft to 12.89 ft below TOC between October 1999 and September 2006 (Table 6).

EXTENT OF FHC-CONTAMINATED SOIL AND GROUNDWATER

Summary of FHC-contaminated Soil

The area impacted by TPHd in soil extends from the vicinity of PE-1, which was installed at the location of the diesel fuel product-line leak, to near the former location of the UST for diesel fuel. The diesel fuel probably migrated east through the gravel backfill along main effluent trunk line 3, past the location of the influent junction box, near the former UST location (Figures 2 and 4).

In September 1998, TPHd at 5800 mg/kg, toluene at 12,000 mg/kg, ethylbenzene at 80,000 mg/kg and xylenes at 460,000 mg/kg were detected in soil sample S-2, which was collected at 9.0 ft bgs in the excavation. Higher concentrations may have been present in the smear zone at 12 ft bgs. Sample S-1 from 4.5 ft bgs was non detect (ND) for TPHd and BTEX.

In August 1999, elevated TPHd concentrations were detected 10 ft east of the influent junction box in SB-3 (1300 mg/kg at 11 ft bgs), and 10 ft south of the former location of the UST for diesel fuel in SB-1 (2100 mg/kg at 11 ft bgs).

In August 2006, TPHd at 160 mg/kg was detected in the sample from 8 ft bgs in the MW-3 boring which was drilled within a few feet of boring SB-1, suggesting that natural degradation has significantly reduced the TPHd concentrations in this area in the seven years between the sampling events.

Minor concentrations of TPHd (1.7 mg/kg to 16 mg/kg) were detected in soil samples from SB-2, MW-1 and MW-2), which are located 20 ft to 30 ft south of the impacted area extending from SB-1 to SB-3. TPHd was not detected in soil samples from SB-4, SB-5 and SB-6, which are located approximately 20 ft south, 30 ft southwest and 30 ft north-northwest, respectively, of PE-1.

Summary of FHC-impacted Groundwater

Free-phase product was present on water in the excavation in September 1998. TPHd at 16,000,000 µg/l was detected in the water sample from the excavation (Appendix B). East of the junction box, free-phase product was present in SB-3 in August 1999. In PE-1, free-phase product was present

between June 2000 and September 2003; TPHd concentrations in this well had declined to 3000 µg/l in December 2006.

The only other location where TPHd was detected in groundwater is SB-1, which had 100 µg/l in 1999. Nearby well MW-3 was ND for TPHd and BTEX in September and December 2006.

Trace concentrations (<1.0 µg/l) of benzene, toluene and/or xylenes have been detected in four grab-groundwater samples (SB-1W, SB-2W, SB-6W, SB-7W) and one monitoring well sample (MW-2) (Tables 2 and 4). None of these concentrations exceed the Environmental Screening Levels (ESLs) established by the SFBRWQCB in February 2005.

Estimate of Remaining Mass of FHCs

The mass of TPHd remaining in soil was calculated using an isoconcentration contour map of the concentrations measured in samples from the soil borings and the 1998 excavation (Figure 4). For contouring purposes, the highest analytical result in a sample from each boring was used in assigning the concentration.

The average concentration of TPHd between two contour intervals was assumed to be one half of the value of the higher contour. The area between each contour interval was measured to estimate the volume of impacted soil within each contour interval. In calculating the volume of the layer of impacted soil, a thickness of 3 ft was used. For estimating the average concentration within the highest contour, the highest analytical result was used.

TPHd

The results of the calculations show that approximately 625 kg of diesel fuel remain in site soil (Table 7). This result probably is biased higher than the actual mass, because the smear zone observed in the 1998 excavation was about 1 ft thick.

RISK ASSESSMENT

Chemical Identification

The chemicals at the site that pose a potential risk to human health and the environment are those associated with diesel fuel. A petroleum distillate, diesel fuel is a complex mixture of hydrocarbons in the range of C10 to C23. Diesel fuel is not considered to be a carcinogen, and is classified as an irritant if exposed to the skin. Diesel fuel is considered to be less hazardous than gasoline because BTEX is not a significant component, and the long-chain hydrocarbons are much less volatile than those in gasoline.

Soil Remediation Goals

The proposed remediation goal for soil remediation at the site are based on the SFBRWQCB's risk-based ESL for commercial/industrial surface soil where groundwater is considered a current or potential source of drinking water. These values are listed below:

Constituent	Commercial/Industrial Land Use (mg/kg)
TPH as Diesel	100
Benzene	0.044
Ethylbenzene	3.3
Toluene	2.9
Xylenes	2.3

Groundwater Remediation Goals

Based on the SFBRWQCB's risk-based ESL for commercial/industrial surface soil where groundwater is a current or potential source of drinking water. These values are listed below:

Constituent	Commercial/Industrial Land Use (µg/l)
TPH as Diesel	100
Benzene	1.0
Ethylbenzene	30
Toluene	40
Xylenes	20

Potential Exposure PathwaysBuildings/Ground Surface

No buildings are located above the area impacted by the diesel fuel release. Nearby buildings include the influent pump house, gravity filter building, chlorine building and the degritter workstation (Figure 2).

The ground surface in the vicinity of the impacted area is paved with asphaltic concrete and reinforced concrete slabs.

Underground Utilities

Underground process piping in the survey area included five main effluent trunk sewage lines in the area of the proposed excavation (Figure 2). These trunk lines drain into the influent junction box, the low point in the system. From the influent junction, sewage flows into the influent pump house, 22 ft to the east. NSD personnel estimated the drop from the junction box to the pump house at 0.1 ft. The bottom of the junction box is about 18 ft bgs. The crowns of trunk lines #1 and #2 enter the junction box at about 12.5 ft bgs, the crown of line #3 enters the junction box at about 13.75 ft bgs, and the crowns of lines #4 and #5 enter the junction box at about 16 ft bgs.

Sensitive Receptors

During EC&A's January 2000 SRS, no private, commercial or municipal water wells or surface water bodies were identified within 500 ft of the site. Man-made surface impounds within the survey area include four concrete-lined treatment ponds about 125 ft south of extraction well PE-1 that are used for holding treated water, sewage overflow, and backwash. A pipeline for discharging treated water into San Francisco Bay is south of the holding ponds. There are two unlined overflow-sludge ponds about 200 ft southeast of PE-1.

REMEDIAL ACTION WORKPLAN

Based on the site-specific data provided in the above CAP, the RAP includes the detailed procedures for conducting excavation and disposal of FHC-impacted soil to be completed during the NSD sewer-system-upgrade construction project, as well as continued groundwater monitoring and sampling of monitoring wells MW-1 through MW-3. As part of the upgrade, a new influent junction box will be installed in the location of extraction well PE-1. PE-1 was installed in the vicinity of the September 1998 product leak in the former diesel product line. Construction of the new junction box will entail an excavation that is planned to be 18 ft wide, 50 ft long, 20 ft deep and approximately centered on extraction well PE-1 (Figure 2). Site work will also include a tunnel for a new 54-inch-diameter pipeline that will be bored laterally to the southeast from the junction box. Due to the complexity of this site, which includes a large number of underground pipes and utilities, this construction activity is the only feasible opportunity to remove FHC-impacted soil, groundwater and/or product in the vicinity of PE-1.

The Monterey Mechanical Company (MMC) under contract with the NSD will be the engineering contractor to coordinate construction activities during site remediation field work. EC&A has been retained to provide the following services: project management and excavation observation; destruction of extraction well PE-1; confirmation soil and groundwater sampling and analysis; dewatering the excavation; groundwater treatment and disposal; and post-excavation groundwater-quality monitoring. EC&A may provide additional services as needed and as approved by the SFBRWQCB.

Task 1 - Project Management/Permitting/Utility Location

Project management includes scheduling and communications with the client, client's engineering contractor, and other subcontractors as needed. EC&A will prepare and submit a Soil Remediation Notification to the Bay Area Air Quality Management District (BAAQMD), and a well-destruction permit to the County of Marin Community Development Agency, Environmental Health Division (CMCDA). Underground piping and utilities will be located by a private underground utility locator service. The site will be marked with white paint for Underground Service Alert (USA) a minimum of 48 hours prior to the commencement of site work. The SFBRWQCB will be notified at least 48 hours prior to excavation activities.

Task 2 - Soil Excavation Observation and Confirmation Sample Collection

EC&A personnel will observe the excavation of approximately 670 cubic yards (cu yds) of in-place soil during the installation of the new effluent trunk lines, junction box, and in the area around extraction well PE-1. Based on the NSD construction specifications, the vertical depth of the excavation will extend to approximately 20 ft bgs. The planned excavation area is shown on Figure 2. MMC under contract with the NSD, will coordinate excavation activities. EC&A field personnel will assist the contractor in soil excavation activities, and will field screen soil with a photoionization detector (PID) to verify source removal.

Based on previous soil data collected in this area, it is expected that residual FHC impacts will be initially encountered at a depth of about 8 ft. To confirm the removal of FHC-contaminated soil, EC&A's field geologist will collect confirmation soil samples from the excavation areas, including but not limited to, sidewalls and the excavation floor. The planned excavation area is shown on Figure 2. Soil samples will be obtained by driving a two-inch-diameter by six-inch clean brass tube into the soil contained in the excavator bucket until the tube is filled with soil. Foil or Teflon™ squares will be placed over each end of the tube and the tube will be sealed with plastic end caps. A minimum of one sample for every 400 square ft of surface area, or one per every 20 lineal ft of the excavation, will be collected for laboratory analysis. Clean-up criteria will be based on the SFBRWQCB's ESLs for commercial/industrial surface soil.

Soil samples will be labeled, recorded on a chain-of-custody form, and placed on ice for transport to a State-licensed analytical laboratory for the required analyses.

Sample Analysis

Soil and groundwater samples from the excavation will be analyzed for TPHd and BTEX by Analytical Methods SW8015Cm/8021B. The results of the sample analyses will be electronically submitted to the State GeoTracker Internet Database.

Task 3 - Excavation De-watering

If encountered during soil excavation activities, TPHd-impacted groundwater and/or product will be pumped from the excavation pit and placed in a temporary storage tank. Groundwater samples will be collected from the excavation water and analyzed for TPHd and BTEX compounds by a state certified laboratory. Groundwater will be pumped from the storage tanks and treated onsite by the treatment plant. The water will be first sent to a silt tank to settle out the particulate matter, and then to the waste-water treatment plant. If contaminant concentrations exceed the NSD requirements, influent water will be polished through a pair of carbon vessels prior to the treatment plant.

Task 4 - Stockpile Management/Characterization

Overburden Stockpile Sampling

Based on historical soil data collected at the site, it is anticipated that the upper 6 ft to 7 ft of overburden soil will be clean and reused as backfill. The soil from this depth will be field screened with a PID as it is excavated to measure FHC vapor concentrations. If volatile organic compound (VOC) vapors are recorded less than 10 parts per million, the overburden soil will be segregated and

stockpiled on plastic sheeting and characterized for onsite reuse as "clean" backfill material. Soil sampling for potential onsite reuse will be in accordance with the criteria in SFBRWQCB's October 20, 2006, *DRAFT Technical Reference Document, Characterization and Reuse of Petroleum Impacted Soil as Inert Waste*. For soil stockpiles ranging from 500 cu yds to 1000 cu yds, twenty (20) discrete soil samples plus one discrete sample for every 500 cu yds in excess of the initial 1000 cu yds will be collected. Samples will be collected in brass sample tubes and prepared for transport to the analytical laboratory as described in Task 3. Overburden soil samples will be analyzed for TPHd and BTEX compounds by Analytical Methods SW8015Cm/8021B. Results of the sample analyses will be electronically submitted to the State GeoTracker Internet Database.

If the sample results do not exceed 10 mg/kg for TPHd and the SFBRWQCB's ESLs for BTEX, with the approval of the SFBRWQCB, the overburden soil will be used as backfill material. If sample results exceed the limits listed above, the conditions for soil reuse specified in the SFBRWQCB's Draft December 17, 2002 document will be used to evaluate whether the overburden can be used as backfill material.

Soil Hauling/Disposal

Excavated soil will be either loaded directly onto trucks for disposal at a appropriate facility or temporarily stockpiled onsite on and covered with plastic sheeting when work is not in progress. Stockpiled soil will be characterized for disposal and hauled to an appropriate disposal facility. Soil stockpile staging areas will be pre-determined by the NSD. At the completion of site work, disposal documentation will be provided to the SFBRWQCB.

It is expected that TPHd-impacted soil will be hauled to a Class II landfill.

Task 5 - Extraction Well Destruction

Extraction well PE-1 will be destroyed during excavation activities by the backhoe operator. The backhoe will be used to remove the Christy box, well casing, the cement/bentonite grout, bentonite seal, and sand filter pack. The well materials will be hauled to an appropriate landfill for disposal. EC&A's field geologist will take field pictures to document the well destruction.

Task 6 - Backfill/Compaction

All backfilling and compaction activities will be completed by MMC under contract with the NSD.

Task 7 - Post-remediation Groundwater Monitoring

If during remediation/construction activities, free product and/or groundwater with elevated TPHd concentrations in sufficient volumes to potentially impact groundwater quality cannot be removed from the excavation, it may be necessary to install an extraction well or monitoring well in the trench backfill material. If field conditions and sample results indicate that an extraction well is necessary, a brief workplan will be submitted to the SFBRWQCB and a permit will be obtained from the CMCD.

A quarterly groundwater sampling event is scheduled for June 2007. This will be the fourth event since installation of the monitoring wells in August 2006. Only xylenes at 0.88 µg/l has been detected in groundwater (MW-2, December 2006). If the analytical results from the upcoming June 2007 event are similar to the previous three events, EC&A will recommend no further sampling of the monitoring wells.

Task 8 - Report Preparation

Following completion of activities and receipt of soil and groundwater sample analytical results, EC&A will prepare a report documenting the excavation and associated activities. If analytical results from soil and groundwater samples collected from the excavation are at or below the their respective ESLs, the report will recommend site closure. A copy of the report will be electronically submitted to the State GeoTracker Internet Database.

PROJECT SCHEDULE

Below is tentative project schedule for implementation of the proposed task items.

RAP Activity	Tentative Dates
CAP submittal/Public notification	May 2007
CAP/RAP approval by the SFBRWQCB	June 2007
Site meeting w/ NSD contractor	June 2007
Soil excavation activities	July or August 2007
Report of soil excavation activities (Remedial Action)	60 days from completion of field work

SITE SAFETY PLAN

EC&A's field work will be performed in accordance with a site specific site safety plan (SSP) prepared for this site (Appendix D). The SSP identifies the chemicals that may be encountered during the field work, describes precautionary measures to be taken when in the presence of these chemicals, and contains a map to the nearest medical facility.

LIMITATIONS

The conclusions presented in this document are professional opinions based on the information presented herein, which includes data generated by others. Whereas EC&A does not guarantee the

May 25, 2007

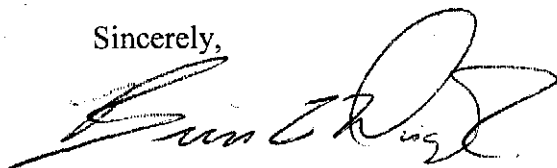
Job No.: 0337,001.99

Edd Clark & Associates, Inc.

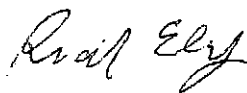
accuracy of data supplied by third parties, we reserve the right to use this data in formulating our professional opinions. This document is intended only for the indicated purpose and project site. Conclusions and recommendations presented herein apply to site conditions existing at the time of our study. Changes in the conditions of the site property can occur with time because of natural processes or the works of man on the site or adjacent properties. In addition, changes in applicable standards can also occur as the result of legislation or from the broadening of knowledge. Accordingly, the findings of this document may be invalidated, wholly or in part, by changes beyond our control.

Thank you for requesting this workplan from EC&A. Please call John Calomiris, project manager, if you have any questions.

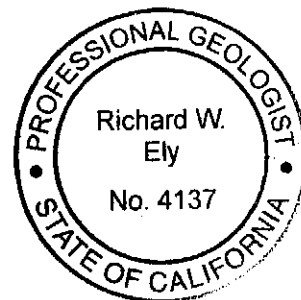
Sincerely,



Brian L. Wingard
Project Geologist



Richard Ely, PG #4137
Senior Geologist



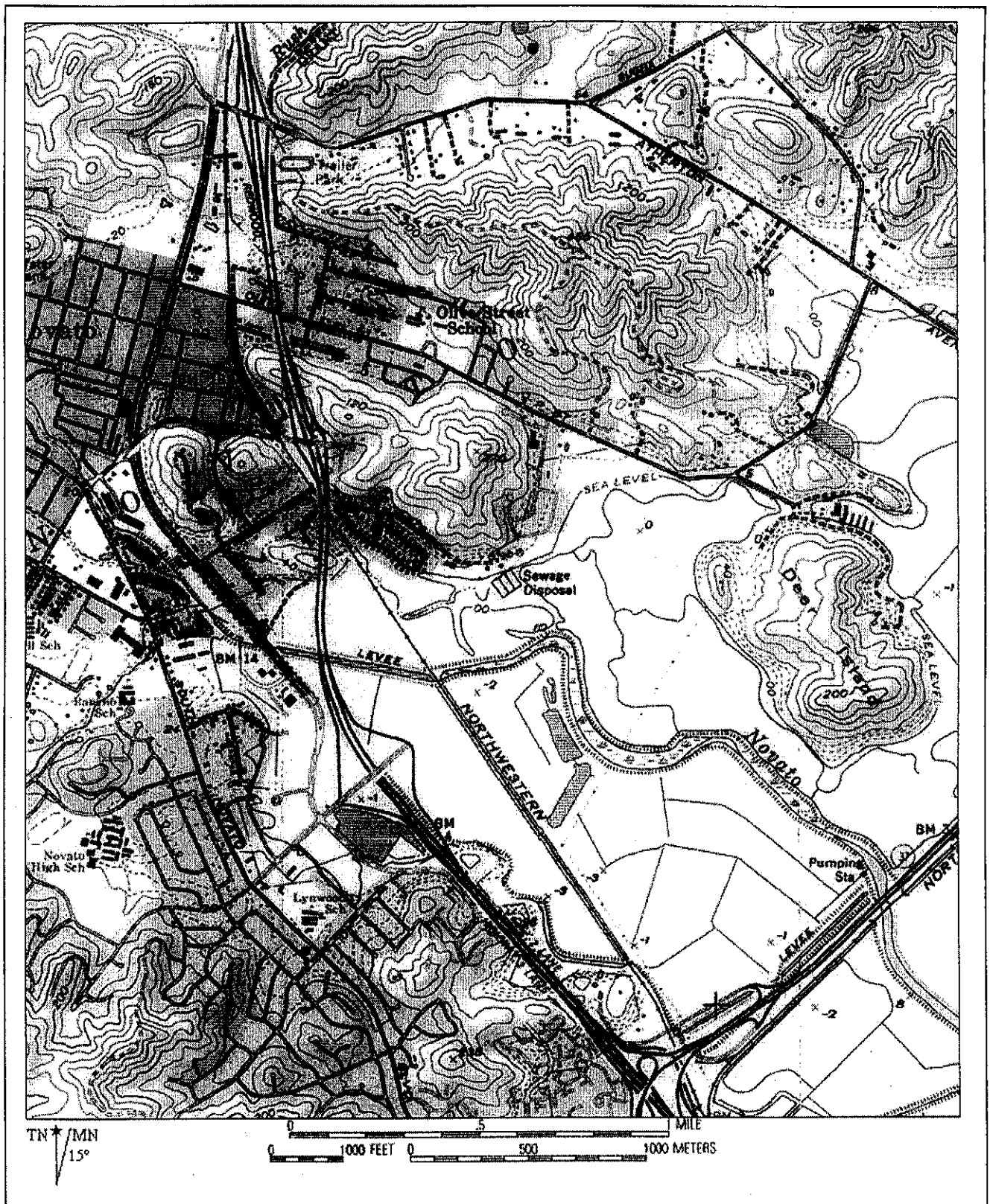
Attachments: Figure 1 - Site Location Map
Figure 2 - Site Map
Figure 3 - Groundwater Elevation Map, 28 December 2006
Figure 4 - Soil Sample Analytical Results
Figure 5 - Groundwater Sample Analytical Results

Table 1 - Analytical Results - Soil Samples from Borings
Table 2 - Analytical Results - Soil Boring Grab-groundwater Samples
Table 3 - Diesel Fuel-contaminated Water and Product Removal Data
Table 4 - Analytical Results - Groundwater Samples from Monitoring Wells and Extraction Well: Fuel Hydrocarbons
Table 5 - Analytical Results - Groundwater Samples from Extraction Well: PNAs
Table 6 - Groundwater Elevation Data
Table 7 - Estimated Mass of TPHd Remaining in Soil

Appendix A - SFBRWQCB March 20, 2007 Letter
Appendix B - Product Line Excavation Documents
Appendix C - Soil Boring and Monitoring Well Logs
Appendix D - Site Safety Plan

cc: Mr. John Jang, San Francisco Bay Regional Water Quality Control Board
Ms. Barbara Zett, County of Marin Office of Waste Management

0337/2007 CAP-RAP



EDD CLARK & ASSOCIATES, INC.
 ENVIRONMENTAL CONSULTANTS

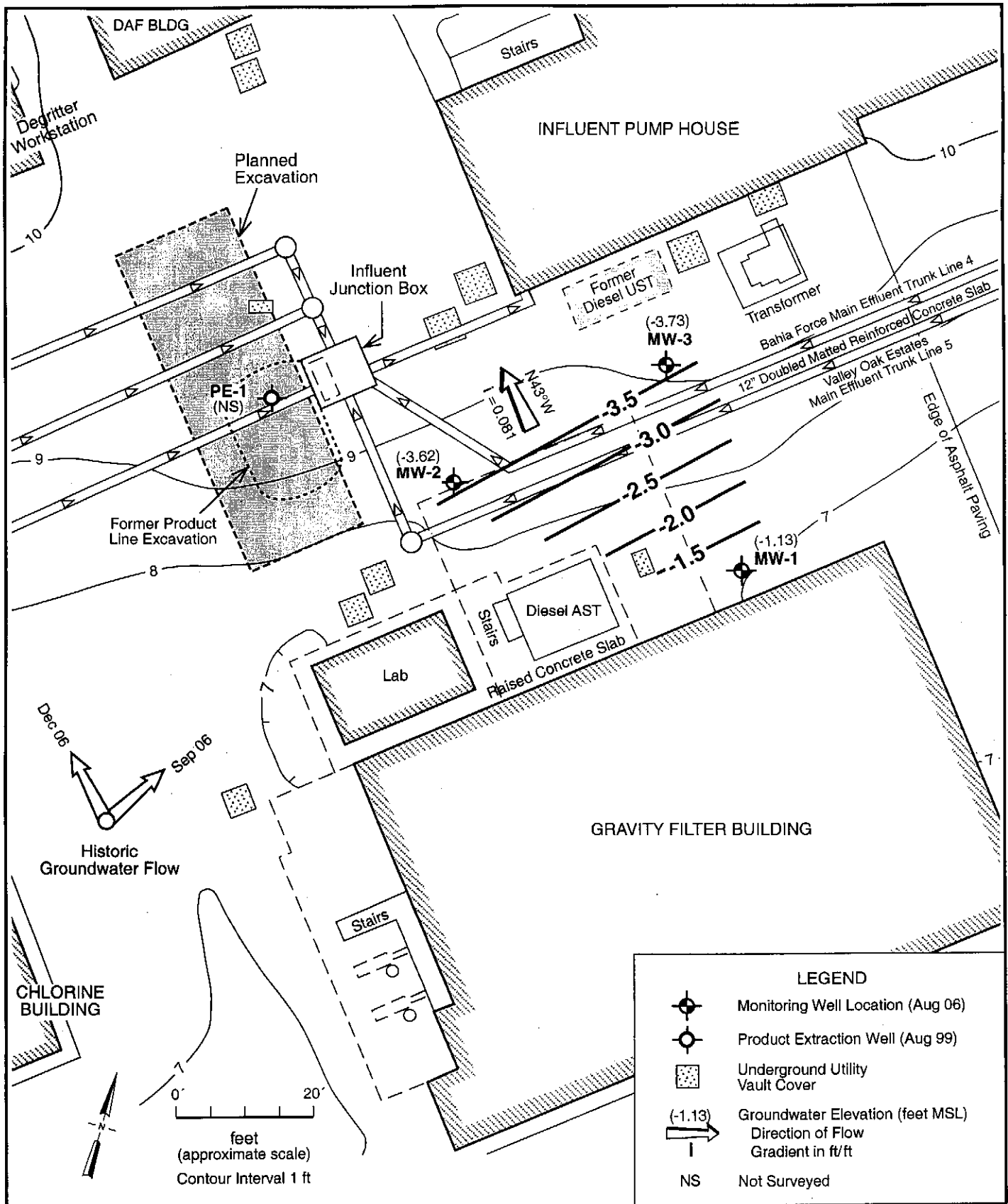
SITE LOCATION MAP

Novato Sanitary District
 500 Davidson Street
 Novato, California

FIGURE
 1

TRACE #GENRG/21No03

JOB NUMBER	0337.001.99	REVIEWED BY	Richard Elv	DATE	April 2006	REVISED DATE	
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GROUNDWATER ELEVATION MAP,

28 December 2006

Novato Water District
Wastewater Treatment Facility
500 Davidson Street
Novato, California

FIGURE

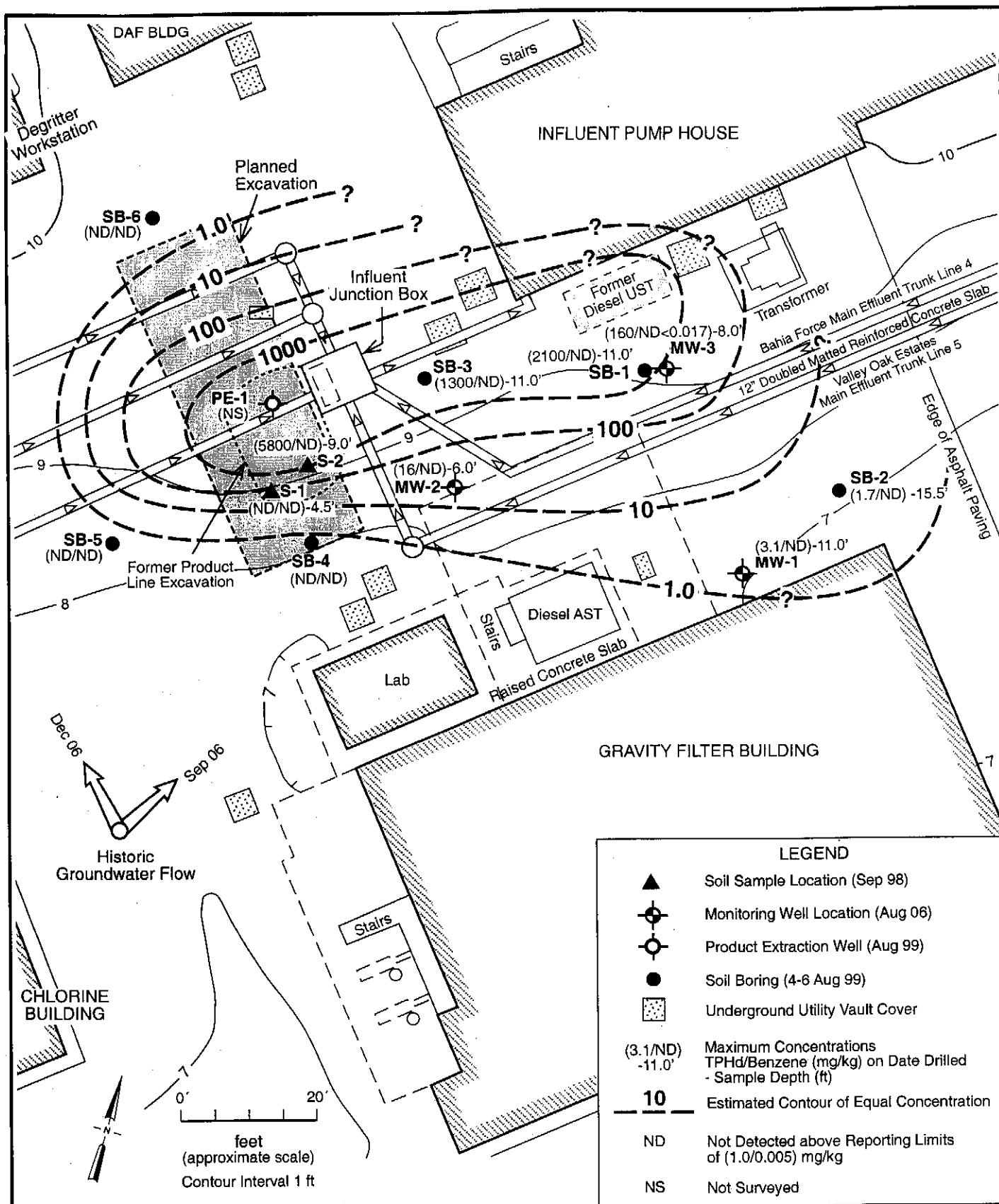
3

EDD CLARK & ASSOCIATES, INC.

ENVIRONMENTAL CONSULTANTS

JOB NUMBER	0337,001.99	REVIEWED BY	EC&A, Richard Ely	DATE	September 1999	REVISED DATE	April 2007	SHEET NO.	1 of 1
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TRACE #419/RG/18/Apr07



SOIL SAMPLE ANALYTICAL RESULTS
 Isoconcentration Contour Map of TPHd
 Novato Water District
 Wastewater Treatment Facility
 500 Davidson Street
 Novato, California

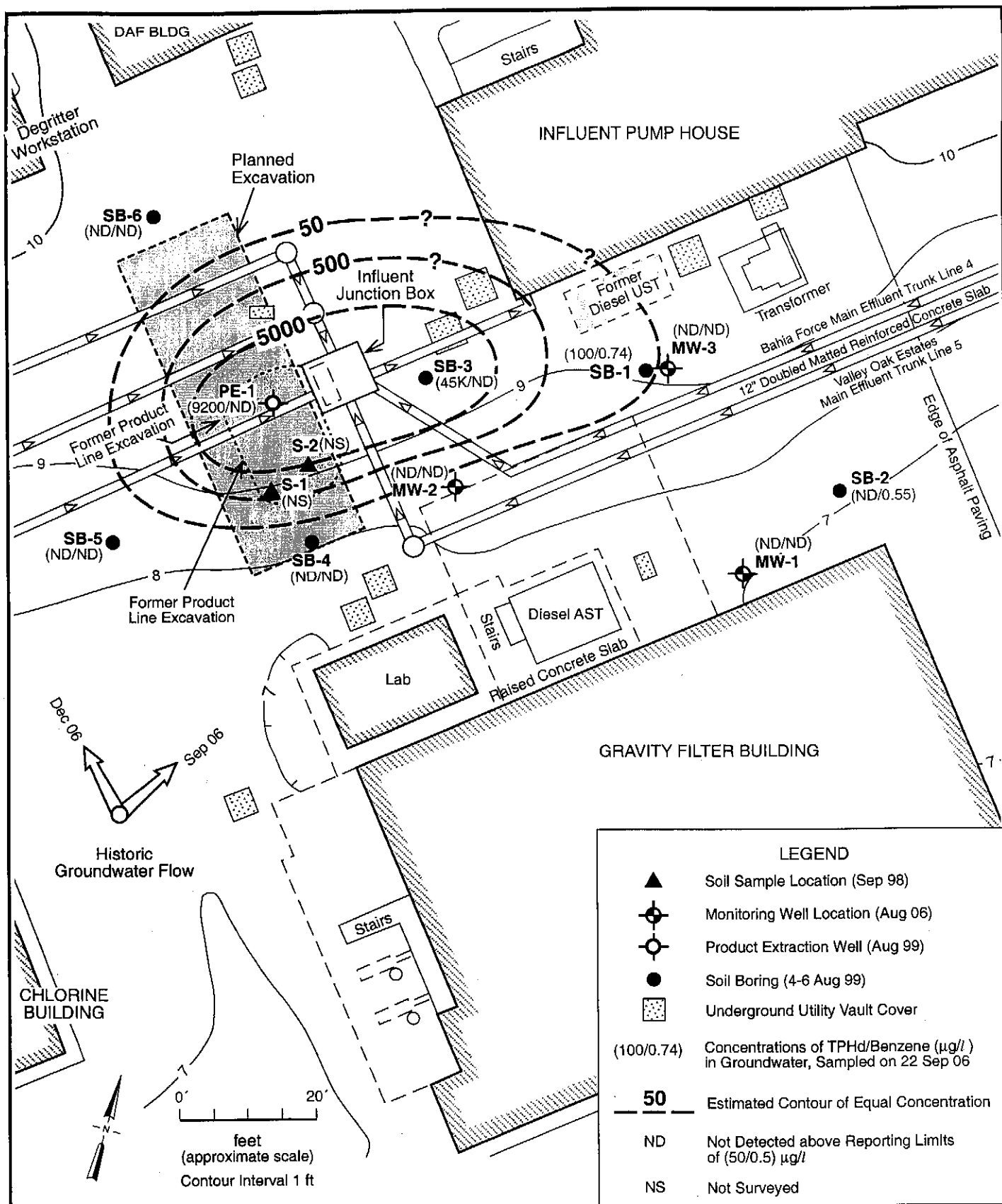
FIGURE

4

EDD CLARK & ASSOCIATES, INC.
 ENVIRONMENTAL CONSULTANTS

JOB NUMBER	0337,001.99	REVIEWED BY	EC&A, Richard Ely	DATE	September 1999	REVISED DATE	April 2007	SHEET NO.	1 of 1
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TRACE #419/RG/18Apr07



GROUNDWATER SAMPLE ANALYTICAL RESULTS
 Isoconcentration Contour Map of TPHd
 Novato Water District
 Wastewater Treatment Facility
 500 Davidson Street
 Novato, California

FIGURE

5

EDD CLARK & ASSOCIATES, INC.
 ENVIRONMENTAL CONSULTANTS

JOB NUMBER	0337,001.99	REVIEWED BY	EC&A, Richard Ely	DATE	September 1999	REVISED DATE	April 2007	SHEET NO.	1 of 1
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TRACE #419/RG/18Apr07

Table 1. Analytical Results - Soil Samples from Borings
Novato Sanitary District, 500 Davidson Street, Novato, California

Sample ID	Sample Date	Sample Depth (ft bgs)	TPHd mg/kg	MTBE mg/kg	Benzene mg/kg	Toluene mg/kg	Ethyl-benzene mg/kg	Xylenes mg/kg
SB-1	08/04/99	10.5 - 11.0	2100 ^a	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-1	08/04/99	15.5 - 16.0	ND<1.0	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-2	08/04/99	10.5 - 11.0	ND<1.0	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-2	08/04/99	15.5 - 16.0	1.7 ^g	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-3	08/04/99	11.0 - 11.5	1300 ^a	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-3	08/04/99	15.5 - 16.0	11 ^a	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-3	08/04/99	19.5 - 20.0	15 ^c	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-4	08/04/99	10.5 - 11.0	ND<1.0	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-5	08/05/99	5.5 - 6.0	ND<1.0	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-5	08/05/99	10.5 - 11.0	ND<1.0	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-6	08/05/99	10.5 - 11.0	ND<1.0	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-6	08/05/99	15.5 - 16.0	ND<1.0	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-7	08/05/99	6.0 - 6.5	ND<1.0	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-7	08/05/99	10.5 - 11.0	ND<1.0	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-8	08/05/99	5.5 - 6.0	ND<1.0	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SB-8	08/05/99	11.0 - 11.5	ND<1.0	ND<0.05	ND<0.005	ND<0.005	ND<0.005	ND<0.005
SP-1-4	08/06/99	—	530 ^a	ND<0.05	ND<0.005	ND<0.005	ND<0.005	0.014
MW-1	08/25/06	5.5	1.2 ^b	NA	ND<0.005	ND<0.005	ND<0.005	ND<0.005
MW-1	08/25/06	11.0	3.1 ^{g,b}	NA	ND<0.005	ND<0.005	ND<0.005	ND<0.005
MW-2	08/24/06	6.0	16 ^{g,b}	NA	ND<0.005	ND<0.005	ND<0.005	ND<0.005
MW-2	08/24/06	11.0	ND<1.0	NA	ND<0.005	ND<0.005	ND<0.005	ND<0.005
MW-3	08/24/06	8.0	160 ^a	NA	ND<0.017	ND<0.017	0.019	0.16
MW-3	08/24/06	11.0	ND<1.0	NA	ND<0.005	ND<0.005	ND<0.005	ND<0.005
MW-3	08/24/06	15.0	ND<1.0	NA	ND<0.005	ND<0.005	ND<0.005	ND<0.005

TPHd: Total petroleum hydrocarbons as diesel
MTBE: Methyl tert-butyl ether
ft bgs: Feet below ground surface
mg/kg: Milligrams per kilogram
ND: None detected at or above the respective reporting limit
NA: Not analyzed

a: Unmodified or weakly modified diesel is significant
c: Aged diesel? is significant
g: Oil range compounds are significant
h: Lighter than water immiscible sheen is present
i:

**Table 2. Analytical Results - Soil Boring Grab-groundwater Samples
Novato Sanitary District, 500 Davidson Street, Novato, California**

Sample ID	Sample Date	TPHd µg/l	MTBE µg/l	Benzene µg/l	Toluene µg/l	Ethyl- benzene µg/l	Xylenes µg/l
SB-1 (W)	08/05/99	100 ^a	ND<5.0	0.74	0.57	ND<0.5	ND<0.5
SB-2 (W)	08/04/99	ND<50	ND<5.0	0.55	ND<0.5	ND<0.5	ND<0.5
SB-3 (W)	08/04/99	45,000 ^{a,h}	ND<1.0 *	ND<0.5	ND<0.5	ND<0.5	ND<0.5
SB-4 (W)	08/05/99	ND<50	ND<5.0	ND<0.5	ND<0.5	ND<0.5	ND<0.5
SB-5 (W)	08/06/99	ND<50	ND<5.0	ND<0.5	ND<0.5	ND<0.5	ND<0.5
SB-6 (W)	08/06/99	ND<50	ND<5.0	ND<0.5	ND<0.5	ND<0.5	0.79
SB-7 (W)	08/06/99	ND<50	ND<5.0	0.67	ND<0.5	ND<0.5	ND<0.5

Notes:

TPHd: Total petroleum hydrocarbons as diesel

MTBE: Methyl tert-butyl ether by EPA Method 8020 unless otherwise noted

µg/l: Micrograms per liter

ND: None detected at or above the respective reporting limit

a: Unmodified or weakly modified diesel is significant

g: Oil range compounds are significant

h: Lighter than water immiscible sheen is present

s: Silica gel used to clean up extract before analysis

*: Samples SB-3 (W) and SB-8 (W) analyzed for MTBE and other gasoline oxygenates (DIPE, ETBE, TAME, and tert-butanol) by EPA Method 8260 with no detections.

Table 3. Diesel Fuel-contaminated Water and Product Removal Data
Novato Sanitary District, 500 Davidson Street, Novato, California

Date	DTW ¹ (feet)	DTP ² (feet)	Product Thickness (inches)	Amount of Water and Product Removed (gallons)
10/01/99	12.71	12.65	0.72	35
10/25/99	12.78	12.77	0.12	19
12/16/99	12.54	12.51	0.36	50
01/05/00	12.60	NP	Sheen (oily droplets)	6
01/14/00	12.59	NP	Sheen (oily droplets)	110
02/24/00	11.52	NP	Sheen (oily droplets)	50
06/08/00	12.42	NP	Sheen	800
09/08/00	12.89	NP	Sheen	680
09/28/00	NR	NP	Sheen	1015
06/05/01	12.51	NP	Sheen (oily droplets)	1010
04/08/02	NR	NP	Sheen	1075
09/23/03	12.58	12.56	0.02	20
Total gallons of diesel fuel-contaminated water removed				4870
Total gallons of product removed				7

- 1: Depth to water from top of well casing
2: Depth to product from top of well casing
NR: Not recorded
NP: No measurable free product

Note: Product and diesel fuel-contaminated water removed from extraction well PE-1. Total depth of extraction well PE-1 is 13.27 feet below top of casing.

**Table 4. Analytical Results - Groundwater Samples from Monitoring Wells and Extraction Well:
Fuel Hydrocarbons
Novato Sanitary District, 500 Davidson Street, Novato, California**

Sample ID	Sample Date	Depth to Water (feet)	TPHd µg/l	Benzene µg/l	Toluene µg/l	Ethyl-benzene µg/l	Xylenes µg/l
MW-1	09/22/06	10.65	ND<50 ⁱ	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	12/29/06	8.01	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
MW-2	09/22/06	11.46	ND<50 ⁱ	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	12/29/06	11.72	ND<50	ND<0.5	ND<0.5	ND<0.5	0.88
MW-3	09/22/06	13.02	ND<50 ⁱ	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	12/29/06	12.73	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
PE-1	06/08/00	12.41	79,000 ^{a,h}	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	09/08/00	12.89	16,000 ^{a,h}	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	09/28/00	NR	65,000 ^{a,h}	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	06/05/01	12.51	510,000 ^{a,h}	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	04/04/02	NR	120,000 ^a	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	09/23/03	12.58	620,000 ^{c,h}	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	09/22/06	12.39	9200 ^c	ND<0.5	ND<0.5	ND<0.5	ND<0.5
	12/29/06	NR	3000 ^c	ND<0.5	ND<0.5	ND<0.5	ND<0.5

Notes:

TPHd: Total petroleum hydrocarbons as diesel

µg/l: Micrograms per liter

ND: Not detected above the reporting limit

NR: Not recorded

a: Unmodified or weakly modified diesel is significant

c: Aged diesel? is significant

h: Lighter than water immiscible sheen is present

Table 5. Analytical Results - Groundwater Samples from Extraction Well: PNAs
Novato Sanitary District, 500 Davidson Street, Novato, California

Sample ID	Sample Date	Ace-naphthene µg/l	Benzo(b)-fluoranthene µg/l	Chrysene µg/l	Fluorene µg/l	Phenanthrene µg/l	1-Methylnaphthalene µg/l	2-Methylnaphthalene µg/l
PE-1	04/04/02	8.6	4.9	21	42	38	48	35
	09/23/03	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10	ND<10

PNAs: Polynuclear aromatic hydrocarbons

µg/l: Micrograms per liter

ND: Not detected above the reporting limit

Results for PNAs not listed above were all ND <2.5 µg/l to <25 µg/l

Table 6. Groundwater Elevation Data
Novato Sanitary District, 500 Davidson Street, Novato, California

Date	Well ID	TOC Elevation feet msl	DTW feet bgs	Groundwater Elevation feet
09/22/06	MW-1	6.88	10.65	-3.77
	MW-2	8.10	11.46	-3.36
	MW-3	9.00	13.02	-4.02
	PE-1	NS	12.9	---
Gradient = N32°E; 0.02 ft/ft				
12/28/06	MW-1	6.88	8.01	-1.13
	MW-2	8.10	11.72	-3.62
	MW-3	9.00	12.73	-3.73
	PE-1	NS	NR	---
Gradient = N43°W; 0.081 ft/ft				

TOC: Top of casing elevation measured in feet referenced relative to mean sea level (msl)

DTW: Depth to water from TOC in feet below ground surface (bgs)

NS: Not surveyed

NR: Not recorded

Table 7. Estimated Mass of TPHd Remaining in Soil
Novato Sanitary District, 500 Davidson Street, Novato, , California

TPHd	Contour Interval 1	Contour Interval 2	Contour Interval 3	Contour Interval 4	Total (kg)
Average Concentration (mg/kg)	5	50	500	2100	
Soil Volume (cubic feet) [†]	10,800	5080	3400	3800	
Soil Volume (cubic meters)	306	144	96	108	
Soil Mass (kg)*	673,000	316,000	212,000	239,000	
TPHd Mass (kg)	3.4	15.8	106	501	626

*: Native soil density is assumed to be 2.2 g/cm³.

†: Contamination zone is assumed to be 3 ft thick.

Appendix A

SFBRWQCB March 20, 2007 Letter



California Regional Water Quality Control Board

San Francisco Bay Region



Linda S. Adams
Secretary for
Environmental
Protection

1515 Clay Street, Suite 1400, Oakland, California 94612
(510) 622-2300 • Fax (510) 622-2460
<http://www.waterboards.ca.gov/sanfranciscobay>

Arnold Schwarzenegger
Governor

March 20, 2007
UST File No. 21-0340 (JMJ)

Novato Sanitary District
Attn: Mr. Stephen R. Krautheim
(email stevek@novatosan.com)
500 Davidson Street
Novato, CA 94945

Subject: Water Board Revised Comments on Monitoring Well Installation Report for Novato
Sanitary District, 500 Davidson Street, Novato, Marin County

Dear Mr. Krautheim:

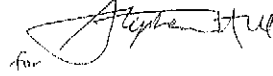
In a letter dated March 5, 2007, Water Board staff provided our comments on your proposal that source removal and remediation be addressed during the sewer-system-upgrade construction planned for later this year. You stated that soil excavation and dewatering that will be performed as part of the proposed construction project is expected to remove any remaining free product and/or TPH-d impacted groundwater remaining in the backfill material along Main Effluent Truck Line 3. After further discussion with your environmental consultant, Water Board staff has concluded that the following revisions to our March 5, 2007, letter are appropriate:

1. Instead of submitting a feasibility study/corrective action plan (FS/CAP) consistent with the requirements outlined in the California UST Regulations (California Code of Regulations, Title 23, Division 3, Chapter 16, Article 11, Section 2725), you shall submit a brief corrective action plan (CAP). A feasibility study is no longer required as it is obvious that the proposed corrective action is the most cost effective remedial alternative. The CAP shall provide details on the proposed corrective action(s), confirmation sampling, and post-remediation monitoring.
2. We will not require you to submit a notice of public comment period if you can provide evidence that you have notified, or will use other means of notifying, interested parties (including owners and residences within 500 feet of the site) about the proposed corrective action and have provided an opportunity for them to comment on the proposed corrective action (possibly as part of the CEQA process). If you cannot do so, then a 30 public comment period is required before we can approve the CAP.



If you have any questions, please contact John Jang of my staff at (510) 622-2366 or via e-mail:
jjang@waterboards.ca.gov.

Sincerely,



Digitally signed by Stephen Hill
Date: 2007.03.20 09:49:19 -07'00'

Bruce H. Wolfe
Executive Officer

cc:

Shari Knieriem, SWRCB, UST Cleanup Fund Unit (email sknieriem@waterboards.ca.gov)
Sunil Ramdass, SWRCB, UST Cleanup Fund Unit (email sramdass@waterboards.ca.gov)

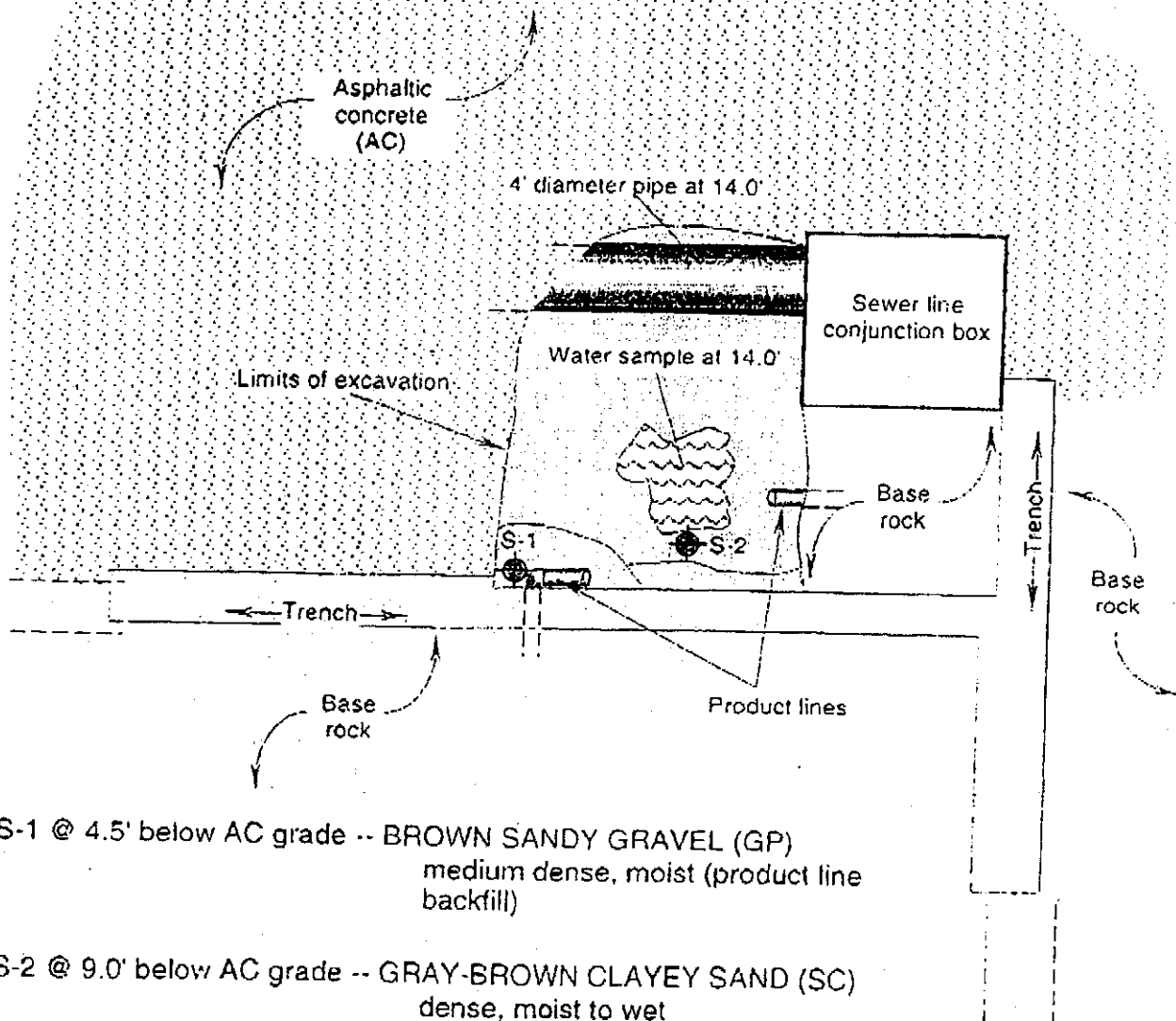
Mr. Michael Frost (email mfrost@co.marin.ca.us)
Marin County Office of Waste Management
P. O. Box 4186
San Rafael, CA 94913-4186

Armando Alegria (email aalegria@co.marin.ca.us)
Marin County Health Dept.
3501 Civic Center Drive, Room 236
San Rafael, CA 94903

Mr. John Calomiris (emails corpmail@ecaenviron.com & jcalomiris@ecaenviron.com)
Edd Clark & Asso., Inc.
P. O. Box 3039
Rohnert Park, CA 94927-3039

Appendix B

Product Line Excavation Documents



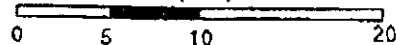
LEGEND:

S-2  Soil sample location and number

Note:

All measurements were made from top of AC on North side of excavation

APPROXIMATE SCALE
(feet)



PROJEC NO.: 21202

DRAWN BY: BDM 9/17/98

CHECKED BY: WR 9/17/98

APPROVED BY:

REVISED:

**BACE Analytical Field
Services**

A Division Of
Brunsing Associates, Inc.

PLATE 1

Site Map

Novato Sanitary
500 Davidson Road
Novato, California

INSPECTION REPORT

BUSINESS NAME: NOVATO SANITARY DISTRICT INSPECTION DATE: 9-8-98
ADDRESS: 550 DAVIDSON STREET CITY: NOVATO
STEVE KRAUTHHEIM

- PIPING FROM UST TO DISPENSER (SECTION) REPORTED TO BE LEAKING - UST SYSTEM TO BE REMOVED AND REPLACED WITH UST
- PORTIONS OF PIPING THAT APPEARED TO BE LEAKING WERE EXPOSED
- THEY WILL TRY TO OVER EXCAVATE AND THEN SAMPLE IN A CLEAR AREA SOIL BEING STICK PIEST
- WILL SAMPLE ^{IN} THE TRENCH BELOW AREA WHERE PIPE LEAKED (IT APPEARED THE DIESEL WAS SEEPING THROUGH THE PIPE IN AREAS WHERE THE PIPING WRAP WAS LOSE ? HOLE IN PIPE)
- WILL ALSO SAMPLE AT THE 90 DEGREE LOCATED IN THE SYSTEM
- COULD NOT SAMPLE UNDER THE DISPENSER SINCE IT WAS SITTING ON A CONCRETE BLOCK WHICH WAS SITTING ON ABOUT ANOTHER FOOT OF CONCRETE - ALSO THE CONCRETE BLOCK ABUTTED THE SIDE OF A BUILDING

PM 9-98 - 9-8-98 - STEVE WANTED TO SAY THEY DUE TO 13' NOW IN GROUNDWATER - STILL HAVEN'T REMOVED THE CONTAMINATED SOIL - WILL SAMPLE GW 9-11-98

Received By: MAIL TO STEVE KRAUTHHEIM / PUBLIC MAINTENANCE Signature

Print Name

Inspected By: Barbara Job

9-11-98

Novato Sanitary District
500 Davidson Street
Novato, CA

After trying to over-excavate to remove the contaminated soil from around a leak in a pipe, Able Maintenance excavated to a depth of 16 feet and approximately 16 feet in diameter at which point water was found in the excavation hole.

The excavation hole was immediately west of the lowest point in the treatment plant where all the sewage lines meet underground for sewage collection and distribution. Sewage lines in gravel trenches are running throughout this area.

Looking at the sidewalls of the excavation hole, you can see a circle of contamination running around the pit at a 12 foot depth. See pictures. It was decided to pump the "groundwater" from the pit and let it recharge and sample again. At the time I arrived on site, approximately 10 a.m., floating could be seen on the top of the water in the excavation hole.

The "groundwater" in the excavation pit was pumped out of the hole for about 1.5 to 2 hours. The water cleared considerably after pumping, so Novato Sanitary District decided to continue to pump. From the pictures taken, you can observe the water clearing and watch globules of product being siphoned into the hose. As we stood around watching the water being removed, we noticed that the water entered the excavation hole only at one point on the south wall and one point on the east wall. Water was not entering the hole from all directions and this led us to assume that perhaps we are not dealing with true groundwater but water being drawn into the excavation hole from the gravel lined pipe trenches surrounding the excavation hole. At about 1:30 p.m. I had to leave to get back to the office since I was the only staff member in that day.

I wanted a soil sample taken from the south wall in the "ring" at the 12 feet depth where it showed discoloration, perhaps, contamination. I also wanted a water sample from the excavation pit taken.

Barbara Zett

057-03-03

**NOVATO SANITARY DISTRICT
Daily Progress Report**

Project : Underground Storage Tank Replacement Project

Project No.: 1995-12

Date : September 8, 1998

Weather: Clear & Warm

Contractor and Foreman: Able Maintenance; Rich Brittan

Describe operations, including items of work, contractor's forces, utility work, results of testing, site visits, and problems encountered. Use reverse side of form for sketches.

The Contractor is working at the Novato Treatment Plant today. Delivered the Monthly progress Report to Rich, who had it signed and returned.

10:00

The Contractor has begun removing the contaminated soil around the leak in the fuel dispenser supply line found last week. Barbara Zett of the County of Marin was on site this morning to observe the initial part of the excavation. The Contractor broke a PVC water or chlorine line during the excavation. The line was empty when it was broke. Provided the Contractor with two 2" elbows and one 2" coupling.

12:42

At 11:30, the Contractor had excavated down below the leak 12 feet. The Contractor was directed to install safety fence around the excavation before the day ends. They were also instructed to remove all the contaminated material closer to the surface prior to excavating any deeper. Reported these findings to Tom Selfridge and Ed Mann. Informed Tom that I will contact Ed Nute and have him investigate what is necessary for "Plan B", if we cannot remove all of the contamination.

1:59

Checked with Ed Nute regarding contaminated soils excavation. He will have Mark Wilson return my call when he returns to the office.

2:15

Informed Rich that he will stop excavating at the end of the day until further notice. We may need to acquire additional permits for removing the contaminated soil.

3:41

Returned to the site at 3:15. Ed Mann was on site and he told me they had hit groundwater at 13 feet. Spoke with Mark Wilson regarding groundwater contamination. He told me that we should notify Barbara Zett of the County of Marin. Mark would also fax me Regulation 8, Rule 40 to review.

Underground Storage Tank Replacement Project
Daily Progress Report
September 8, 1998
Page 2

4:16

Contacted Barbara Zett earlier and informed her of our potential groundwater contamination. She informed me that we should go through the normal procedure and test the groundwater and the soil for diesel contamination. The results should be sent to them and they will judge them accordingly. If there is contamination, she will send us an Unauthorized Release Form to be filled out and returned. They will distribute it to the various agencies that should receive it. She also told me that our consultant should be informing us what to do procedurally. She would not offer any procedure advice or recommend any consultants, but to check the "Yellow Pages".

I told Tom my findings. I told him I thought that we might want to consider contacting another consultant to handle the remediation aspects of this project. He thought that we should meet with Mark Wilson and discuss our options. I contacted Mark Wilson and scheduled a meeting for tomorrow morning at 8:45.

I visited the site and informed Rich that we need to complete the testing of the water and the soil so we can pass on the information to the County of Marin. The excavation has been properly fenced off for the evening.

Received a copy of Regulation 8, Rule 40 by fax.

Signature of Project Engineer

**NOVATO SANITARY DISTRICT
Daily Progress Report**

Project : Underground Storage Tank Replacement Project

Project No.: 1995-12

Date : September 11, 1998

Weather: Clear & Warm

Contractor and Foreman: Able Maintenance; Rich Brittan

Describe operations, including items of work, contractor's forces, utility work, results of testing, site visits, and problems encountered. Use reverse side of form for sketches.

The Contractor is working at the Novato Treatment Plant today performing the tasks necessary to sample the water and soil present in the excavation where contaminated fill was removed several days ago. The Contractor was directed to backfill the excavation after the testing was done.

During the sampling of water and soil, Barbara Zett of the County of Marin was on site to witness. The Contractor had Ecology Control Industries on site to remove the contaminated water that had accumulated in the hole. They removed approximately 250 gallons of water prior to taking a sample of water. Barbara Zett seemed to think that this water was not actual ground water but an accumulation of water in a trench. She thought this because it was only flowing into the excavation from one direction. A soil sample was taken from within the excavation at 10 foot depth, and another was taken at the bend in the fuel line nearby as required in the specifications. After the sampling was complete, the Contractor installed a well as directed and began backfilling the excavation. Barbara Zett was informed that we are planning to backfill the excavation and wait for the fuel tank to be removed from the ground before we decide what actions to take regarding the contamination.

Signature of Project Engineer

MARIN COUNTY DEPARTMENT OF PUBLIC WORKS
OFFICE OF WASTE MANAGEMENT

P.O. Box 4186
San Rafael, CA 94913-4186
Phone: (415) 499-6647
Fax: (415) 499-3724

PERMANENT TANK CLOSURE INSPECTION SHEET

SITE NAME: NUVATO SANITARY DISTRICT DATE: 10-21-98
ADDRESS: 500 DAVIDSON STREET CITY: NUVATO CA ZIP: _____
RESPONSIBLE PARTY: CONTRACTOR ABOVE MAINTENANCE CONTACT: RICO BRITAIN
ADDRESS: 51 FOLEY STREET CITY: SANTA ROSA 95401 PHONE: _____

PRE-INSPECTION INFORMATION:

HAS PERMIT BEEN ISSUED YES NO

MATERIALS IN TANK(s): _____ Regular

UL ☒ DIESEL

WO _____ OTHER

REASON FOR REMOVAL: 1998 UPGRADES - REPLACE WITH ABOVE GROUND TANK

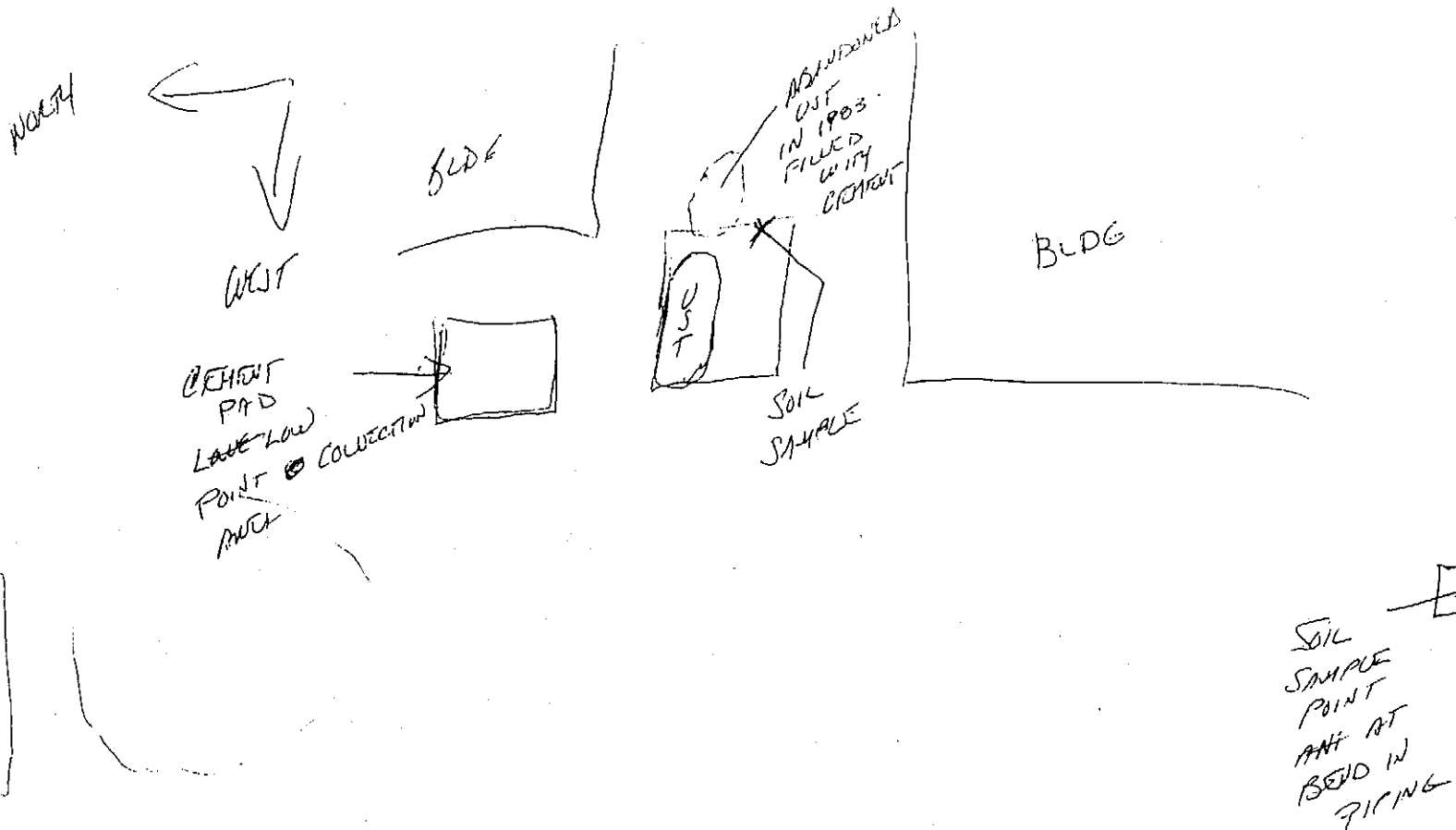
HISTORY: INDICATE PROBLEM _____ YES ☒ NO ☒ EXPLAIN: _____

DO MONITORING WELLS EXIST ON SITE? ☒ YES _____ NO (Indicate on site map)

ON-SITE INFORMATION (Prepare site map on second page)

1. IS SITE SAFETY PLAN ON SITE? ☒ YES _____ NO
2. CONDITION OF TANKS AND PIPING: TANK LOOKED INTACT (PIPING REMOVED BEFORE)
3. EVIDENCE OF LEAKAGE? _____ YES ☒ NO EXPLAIN _____
4. WAS GROUNDWATER ENCOUNTERED IN PIT? _____ YES ☒ NO IF YES, DEPTH? _____
FLOATING PRODUCT? _____ YES ☒ NO SHEEN? _____ YES ☒ NO
WAS WATER SAMPLED? _____ YES ☒ NO PIT PUMPED? _____ YES _____ NO
5. ANALYSIS REQUIRED? _____ TPH AND BTEX ☒ OTHER _____
6. TANK #1 TANK #2 TANK #3 TANK #4
LEL 12 OXYGEN 21 LEL _____ OXYGEN _____ LEL _____ OXYGEN _____ LEL _____ OXYGEN _____
7. SAMPLES FROM STOCKPILE TAKEN? _____ YES ☒ NO If yes, how many? _____
8. SOIL/GW SAMPLING COMMENTS: EXCAVATION PIT WAS MUCH DEEPER THAN THE TANK -
9. WAS PIT OVEREXCAVATED? _____ YES _____ NO Volume? _____ cubic yards
10. TANK MANIFESTED? _____ YES ☒ NO RINSTATE MANIFESTED? ☒ YES _____ NO
PIT WATER MANIFESTED _____ YES _____ NO
11. WASTE HAULER: _____

INSPECTOR: Subaru Jit
RECEIVED BY: MAIL TO NUVATO SANITARY : ABOVE MAINTENANCE
PRINT NAME: _____ DATE: MAIL 10-28-98



COMMENTS:

8 - TANK WAS UNDER CONDUIT LINES OF MANY SIZES (DESCRIPTIONS! SEE PICTURES). TANK HAD TO BE SIDED UNDER THE LINES & MOVED TO SOUTHERN END OF PIT IN ORDER TO LIFT IT.

IT APPEARED THAT MOST OF THE BACKFILL IN THE EXCAVATION PIT WAS GRAVEL OR IMPORTED SOIL. ONCE THE TANK WAS REMOVED, THE SOILS STARTED TO CRUMBLE IN. THERE WAS ONLY ONE PLACE IN THE EXCAVATION PIT TO SAFELY TAKE SOIL SAMPLES THAT WERE "SOIL" & NOT GRAVEL. @ THE SPOT IS INDICATED ON THE DIAGRAM ABOVE. NO ODORS OR DISCOLORATION OF SOILS NOTED.

NO GROUND WATER WAS SEEN IN THE EXCAVATION PIT. — SEE COMMENTS ON @ GROUND WATER ON INSPECTION SHEET DEALING WITH PIPE REMOVAL

ONE OTHER SOIL SAMPLE WAS TAKEN AT A PIPE BEND IN THE PIPING. THE HOLE WAS SHALLOW @ (1 FT DEEP) & LOOKED CLEAN.



BACE Analytical & Field Services
A Division of Bruning Associates, Inc.

September 17, 1998

Log No: 2981

Laboratory Certificate Number: 1264

Bob Fischer
Able Maintenance
51 Foley Street
Santa Rosa, CA 95401

ATTN: Bob Fischer

RE: Results of the analyses of soil and water samples obtained for Novato
Sanitary District on September 11, 1998.

Dear Mr. Fischer,

This letter serves to confirm the analytical results previously communicated to you.
Should any questions arise concerning procedure or results, please feel free to
contact us.

Sincerely,

William G. Rotz
Director, Mobile Analytical Services

Client: Able Maintenance
Contact: Bob Fischer

Page 2 of 2

Sample Date: 9/11/98
Analysis Date: 9/15, 16 & 17/98

BAFS Log No: 2981

METHOD: EPA 5030/8020

Matrix: Soil

Parameter	Reporting Limit µg/kg	Lab No: Descriptor:	Results - µg/kg	
			2981-1 (S1 @ 4.5')	2981-2 (S2 @ 9.0')
Benzene	5.0		ND	ND
Toluene	5.0		ND	12
Ethylbenzene	5.0		ND	80
Xylenes (total)	5.0		ND	460
Dilution Factor			1	2

METHOD: EPA 3550 / GC FID

Parameter	Reporting Limit mg/kg	Lab No.: Descriptor:	Results - mg/kg	
			2981-1 (S1 @ 4.5')	2981-2 (S2 @ 9.0')
TPH - diesel	1.0		ND	5800
Dilution Factor			1	20

Matrix: Water

METHOD: EPA 3510 / GC FID

Parameter	Reporting Limit mg/L	Lab No.: Descriptor:	Results - mg/L
			2981-3 (Excavation Water)
TPH - diesel	0.05		16000
Dilution Factor			1000

Note: ND = not detected



QUALITY CONTROL SUMMARY

Client: Able Maintenance

EAFS Log No. 2981

Client Contact: Bob Fischer

Sample Date: 9/11/98

Analysis Date: 9/15, 16, & 17/98

Matrix: Soil

Parameter	% RECOVERY				
	CCV%*	Blank	Spike	Spike Dup	RPD
Diesel	96	ND	92	96	4.1
Benzene	100	ND	106	98	8.0
Toluene	103	ND	106	98	8.0
Ethylbenzene	98	ND	106	95	9.0
Xylenes	105	ND	109	97	12

Matrix: Water

Parameter	% RECOVERY				
	CCV%*	Blank	Spike	Spike Dup	RPD
Diesel	95	ND	101	110	8.5

* Continuous Calibration Verification Standard



PROJ. NO	PROJECT NAME	NO. OF CONTAINERS	ANALYSIS	REMARKS
21702	Nouveau Sanitation Dist.			
LP NO	SAMPLERS (Signature)			
	Dr. H. H. Casot			
DATE	SAMPLE ID	TYPE		
9/11/98	S-1e4.5' - product line	soil	1-bag XX	2981-1
	S-2e9.0' - south sidewalk	soil	1-bag XX	2981-2
	Excavation water - possible	water	1-bag X	2981-3
	perched water in trench			

LABORATORY:

Relinquished by (Signature) Dr. H. H. Casot Date/Time 9/11/98 5:50

Relinquished by (Signature) _____ Date/Time _____

Relinquished by (Signature) _____ Date/Time 9/11/98 1808

Received by (Signature) William [Signature]

Received for Laboratory by (Signature) _____

Remits

Results by Thursday 17th

BRUNSON ASSOCIATES, INC.

Offices:

PO Box 588
Windsor CA 95492
707-838-3027

1215 Elk St., Ste. B
Rock Springs WY 82901
307-362-9777

Appendix C

Soil Boring and Monitoring Well Logs

BORING LOCATION Treatment Plant, 500 Davidson St. (south of former Diesel UST)		ELEVATION AND DATUM Ground Surface		BORING NO. SB-1
DRILLING AGENCY Clear Heart, LLC		DRILLER BR	DATE STARTED 4 Aug 99	DATE FINISHED 5 Aug 99
DRILLING EQUIPMENT DR 10K Truck-mounted Drill Rig		COMPLETION DEPTH 30.0 ft	SAMPLER CA Modified Split Spoon	
DRILLING METHOD Direct Push to 16.5 ft, SFA to 30 ft		BORING DIA. 4 inches	NO. OF SAMPLES 3 Soil and 1 Grab Groundwater	
SIZE AND TYPE OF CASING —		FROM — TO —	WATER LEVEL FIRST ~10 ft ??	BEFORE SAMPLE 22.9 ft
TYPE OF PERFORATION —		FROM — TO —	CORE BARREL 1.5 inch ϕ	LENGTH 18 inches
SIZE AND TYPE OF PACK —		FROM — TO —	LOGGED BY: JC	CHECKED BY: CYP
TYPE OF SEAL	NO. 1 —	FROM — TO —	COMMENTS Soil samples field screened with Photo-Ionization Detector (PID), results in parts per million (ppm). Drilled with vacuum truck from grade to 4.5 ft because of underground utilities.	
	NO. 2 —	FROM — TO —		

DEPTH (feet)	Samples	Sample ID	PID	Blows	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
5		6.0	0		Asphalt-7 inches, Base rock.		
10		11.0	40		SANDY CLAY/CLAYEY SAND (SC/CL) with gravel, brown (10YR 4/3), moist, 40% fine-grained sand, 40% clay, 20% gravel.	SC/CL	
15		16.0	0		Gray, diesel odor in soil in top half of middle tube.		
					SILTY SAND (SM), yellowish brown (10YR 5/4), damp, dense, 60% fine-grained sand, 40% silt.	SM	
					Brown (10YR 5/3), damp.		
					Driller estimates blow count at 50 for 1-2 inches.		
20			0		SILTY SANDSTONE, light grayish brown (10YR 6/2), dry, very dense, indurated. [Bedrock] Unable to penetrate with Direct Push equipment, switch to 4" SFA and drill to 30 ft.	Silty Sandstone	

TRACE #147/RG/30Sep99

EDD CLARK & ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS

LOG OF SOIL BORING SB-1
Novato Water District
Wastewater Treatment Facility
500 Davidson Street
Novato, California

PLATE
4

JOB NUMBER 0337,001.99	REVIEWED BY Cheri Page	DATE September 1999	REVISED	SHEET NO. 1 of 2
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BORING LOCATION					Treatment Plant, 500 Davidson St. (south of former Diesel UST)		CONTINUED LOG, SHEET NO. 2 of 2		FOR BORING NO. SB-1	
DEPTH (feet)	Samples	Sample ID	PID	Blows	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION			
25										
30					Auger refusal.					
35					TD: 30.0 ft bgs Note: After auger removed, boring open to about 25 ft bgs. Cave-in occurred from surface due to large-diameter starter hole at surface. Two-inch temporary well screen inserted from 5 ft to 25 ft bgs. Boring dry when well screen inserted at 1130 hr. At 1640 hr wet soil in bottom of boring-no standing water. Water sample SB-1(w) collected on 5 Aug 99 at 1500 hr; DTW - 22.90 ft bgs. Water appeared to be seeping down the boring from about 10 ft bgs.					
40										
45										
50										

TRACE #147RG/30(Sep99)

EDD CLARK & ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS

LOG OF SOIL BORING SB-1 (Cont'd)
Novato Water District
Wastewater Treatment Facility
500 Davidson Street
Novato, California

PLATE

4

JOB NUMBER	0337,001.99	REVIEWED BY	Cheri Page	DATE	September 1999	REVISED	SHEET NO. 2 of 2
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BORING LOCATION Treatment Plant, 500 Davidson St. (33 ft southeast of boring SB-1)				ELEVATION AND DATUM Ground Surface		BORING NO. SB-2	
DRILLING AGENCY Clear Heart, LLC		DRILLER BR		DATE STARTED DATE FINISHED		4 Aug 99 → 5 Aug 99	
DRILLING EQUIPMENT DR 10K Truck-mounted Drill Rig				COMPLETION DEPTH 30.0 ft		SAMPLER CA Modified Split Spoon	
DRILLING METHOD Direct Push to 16.5 ft, SFA to 30 ft		BORING DIA. 4 inches		NO. OF SAMPLES 3 Soil and 1 Grab Groundwater			
SIZE AND TYPE OF CASING —		FROM — TO —		WATER LEVEL FIRST Not observed		BEFORE SAMPLE 18.18 ft	
TYPE OF PERFORATION —		FROM — TO —		CORE BARREL 1.5 inch ϕ		LENGTH 18 inches	
SIZE AND TYPE OF PACK —		FROM — TO —		LOGGED BY: JC		CHECKED BY: CYP	
TYPE OF SEAL		NO. 1 —		FROM — TO —		COMMENTS Soil samples field screened with Photo-ionization Detector (PID), results in parts per million (ppm). Drilled with vacuum truck from grade to 4.5 ft because of underground utilities.	
		NO. 2 —		FROM — TO —			

DEPTH (feet)	Samples	Sample ID	PID	Blows	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
					Asphalt-7 inches, Base rock.		
					SANDY CLAY (CL) dark brown (10YR 3/3) with gray mottling, moist, 60% clay, 40% fine-grained sand.	CL	
5		6.0	0	0	▼ Dark gray (5Y 4/1), very moist, 40% clay, 40% fine-grained sand, 20% gravel.		
10		11.0	0		CLAYEY SAND (SC), yellowish brown (10YR 5/5), slightly moist, 70% fine- to medium-grained sand, 20% clay, 10% silt.	SC	
15		16.0	0		SILTY SAND (SM), yellowish brown (10YR 5/6), dry, very dense, indurated, 70% fine-grained sand, 30% silt.	SM	
20					SILTY SANDSTONE, grayish brown (2.5Y 4/2), dry. [Bedrock]	Silty Sandstone	

(TRACE #147/RG/30Sep99)

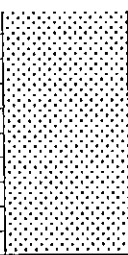
EDD CLARK & ASSOCIATES, INC.
 ENVIRONMENTAL CONSULTANTS

LOG OF SOIL BORING SB-2
 Novato Water District
 Wastewater Treatment Facility
 500 Davidson Street
 Novato, California

PLATE

5

JOB NUMBER	0337,001.99	REVIEWED BY	Cheri Page	DATE	September 1999	REVISED		SHEET NO.	1 of 2
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BORING LOCATION					Treatment Plant, 500 Davidson St. (33 ft southeast of boring SB-1)		CONTINUED LOG, SHEET NO.	2 of 2	FOR BORING NO.	SB-2
DEPTH (feet)	Samples	Sample ID	PID	Blows	MATERIAL DESCRIPTION				USCS	WELL CONSTRUCTION
25										
30										
					TD: 30.0 ft bgs					
					Note: After auger removed, boring open to 27.5 ft bgs. Two-inch temporary well screen inserted from 7.5 ft to 27.5 ft bgs. Boring dry when well screen inserted; after 3 hrs, DTW 20.16 ft below grade.					
					Water sample SB-2(w) collected on 4 Aug 99 at 1645 hr; DTW - 18.18 ft bgs.					
					Water level at 10.18 ft bgs on 5 Aug 99, approximately 1500 hr.					
35										
40										
45										
50										

(TRACE #147/RG/30Sep99)

EDD CLARK & ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS

LOG OF SOIL BORING SB-2 (Cont'd)
Novato Water District
Wastewater Treatment Facility
500 Davidson Street
Novato, California

PLATE

5

JOB NUMBER	0337,001.99	REVIEWED BY	Cheri Page	DATE	September 1999	REVISED	SHEET NO. 2 of 2
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BORING LOCATION Treatment Plant, 500 Davidson St. (east of former product line leak excavation in sewer trunk line trench)				ELEVATION AND DATUM Ground Surface		BORING NO. SB-3	
DRILLING AGENCY Clear Heart, LLC		DRILLER BR		DATE STARTED 4 Aug 99		DATE FINISHED 4 Aug 99	
DRILLING EQUIPMENT DR 10K Truck-mounted Drill Rig				COMPLETION DEPTH 20.0 ft		SAMPLER CA Modified Split Spoon	
DRILLING METHOD DP to 16 ft, 4" SFA to 20 ft		BORING DIA. 4 inches		NO. OF SAMPLES 3 Soil and 1 Grab Groundwater			
SIZE AND TYPE OF CASING —		FROM — TO —		WATER LEVEL FIRST 13.0		BEFORE SAMPLE 15.0 ft	
TYPE OF PERFORATION —		FROM — TO —		CORE BARREL 1.5 inch ϕ		LENGTH 18 inches	
SIZE AND TYPE OF PACK —		FROM — TO —		LOGGED BY: JC		CHECKED BY: CYP	
TYPE OF SEAL		NO. 1 —		FROM — TO —		COMMENTS Soil samples field screened with Photo-ionization Detector (PID), results in parts per million (ppm). Drilled with vacuum truck from grade to 4.5 ft because of underground utilities.	
		NO. 2 —		FROM — TO —			

DEPTH (feet)	Samples	Sample ID	PID	Blows	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
					Asphalt-7 inches, Base rock.		
					CLAYEY SAND (SC) with gravel, grayish brown (2.5Y 6/2), very moist, 50% fine-grained sand, 30% clay, 20% gravel.	SC	
5			0		No recovery except for shoe. ▼ Dark greenish gray, wet, 70% fine-grained sand, 30% clay.		
10		11.5			▼ Diesel odor from 11.0 to 11.5 ft, color becomes brown after 11.5 ft. No free water in boring.		
15		16.0			Water in boring at 13 ft.		
					CLAYEY SANDY GRAVEL (GC), gray, wet (free water), 40% gravel, 30% clay, 30% fine-grained sand, with organic material. Free product globules floating on water. [Boring located in sewer line trench]	GC	
20		20.0	0		SILTY SANDSTONE, light olive brown (2.5Y 6/3), dry, indurated. [Bedrock]	Sandstone	
					TD: 20.0 ft bgs		
					Note: Water sample SB-3(w) collected from open boring at 1620 hr; DTW - 15 ft bgs.		

EDD CLARK & ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS

LOG OF SOIL BORING SB-3
Novato Water District
Wastewater Treatment Facility
500 Davidson Street
Novato, California

PLATE

6

JOB NUMBER	0337,001.99	REVIEWED BY	Cheri Page	DATE	September 1999	REVISED	SHEET NO. 1 of 1
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TRACE #147/RG/305ep99)

BORING LOCATION Treatment Plant, 500 Davidson St. (south of former product line leak excavation)			ELEVATION AND DATUM Ground Surface		BORING NO. SB-4
DRILLING AGENCY Clear Heart, LLC		DRILLER BR	DATE STARTED DATE FINISHED 4 Aug 99		5 Aug 99
DRILLING EQUIPMENT DR 10K Truck-mounted Drill Rig			COMPLETION DEPTH 22.0 ft	SAMPLER CA Modified Split Spoon	
DRILLING METHOD DP to 11.5 ft, 4" SFA to 22 ft		BORING DIA. 4 inches	NO. OF SAMPLES 2 Soil and 1 Grab Groundwater		
SIZE AND TYPE OF CASING		FROM — TO —	WATER LEVEL	FIRST Not observed	BEFORE SAMPLE 17.08 ft
TYPE OF PERFORATION		FROM — TO —	CORE BARREL	1.5 inch ϕ	LENGTH 18 inches
SIZE AND TYPE OF PACK		FROM — TO —	LOGGED BY: JC	CHECKED BY: CYP	
TYPE OF SEAL	NO. 1	FROM — TO —	COMMENTS Soil samples field screened with Photo-Ionization Detector (PID), results in parts per million (ppm). Drilled with vacuum truck from grade to 4.5 ft because of underground utilities.		
	NO. 2	FROM — TO —			

DEPTH (feet)	Samples	Sample ID	PID	Blows	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
					Asphalt-7 inches, Base rock.		
5		6.5	0		CLAYEY SAND (SC) with gravel, dark yellowish brown (10YR 5/6), moist, 50% clay, 30% fine-grained sand, 20% gravel, with little debris (glass, garbage). [Fill]	SC	
10		11.0	0		SILTY SAND (SM), yellowish brown (10YR 5/6), damp, dense, 60% fine-grained sand, 40% silt. ▼ Very dense.	SM	
15					SILTY SANDSTONE, grayish brown (10YR 5/2), dry, indurated. [Bedrock]	Silty Sandstone	
20					Auger refusal at 22.0 ft; boring open to 18 ft after auger removal.		
					TD: 22.0 ft bgs		
					Note: Temporary well screen inserted in boring from grade to 18 ft bgs. Water sample SB-4(w) collected on 5 Aug 99 at 1400 hr; DTW - 17.08 ft bgs.		

(TRACE #147/RG/30Scp99)

EDD CLARK & ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS

LOG OF SOIL BORING SB-4
Novato Water District
Wastewater Treatment Facility
500 Davidson Street
Novato, California

PLATE

7

JOB NUMBER 0337,001.99	REVIEWED BY Cheri Page	DATE September 1999	REVISED	SHEET NO. 1 of 1
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BORING LOCATION Treatment Plant, 500 Davidson St. (west of former product line leak excavation)		ELEVATION AND DATUM Ground Surface		BORING NO. SB-5
DRILLING AGENCY Clear Heart, LLC	DRILLER BR	DATE STARTED 5 Aug 99	DATE FINISHED 6 Aug 99	
DRILLING EQUIPMENT DR 10K Truck-mounted Drill Rig		COMPLETION DEPTH 20.0 ft	SAMPLER CA Modified Split Spoon	
DRILLING METHOD DP to 11.5 ft, 4" SFA to 20 ft	BORING DIA. 4 inches	NO. OF SAMPLES 2 Soil and 1 Grab Groundwater		
SIZE AND TYPE OF CASING —	FROM — TO —	WATER LEVEL —	FIRST Not observed	BEFORE SAMPLE 16.8 ft
TYPE OF PERFORATION —	FROM — TO —	CORE BARREL 1.5 inch ϕ	LENGTH 18 inches	
SIZE AND TYPE OF PACK —	FROM — TO —	LOGGED BY: JC	CHECKED BY: CYP	
TYPE OF SEAL	NO. 1 —	FROM — TO —	COMMENTS Soil samples field screened with Photo-Ionization Detector (PID), results in parts per million (ppm). Drilled with vacuum truck from grade to 4.5 ft because of underground utilities.	
	NO. 2 —	FROM — TO —		

DEPTH (feet)	Samples	Sample ID	PID	Blows	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
					Asphalt-7 inches, Base rock.		
					SILTY SANDY GRAVEL (GM), with debris. [Fill]	GM	
5		6.0	0		SANDY CLAY (CL), black (N2 54/), very moist, 70% clay, 30% fine-grained sand with organic material.	CL	
10		11.0	0		Gray mottling.		
					SANDY SILT (SM), yellowish brown (10YR 5/6), damp, 60% fine-grained sand, 40% silt. Becomes very dense after 11.5 ft. No water in boring	SM	
15					SILTY SANDSTONE, light gray (2.5Y 9/2), dry, indurated. [Bedrock]	Silty Sandstone	
20					TD: 20.0 ft bgs Note: Temporary well screen inserted from 10 to 20 ft bgs. Water sample SB-5(w) collected on 6 Aug 99; DTW - 16.8 ft bgs.		

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LOG OF SOIL BORING SB-5
Novato Water District
Wastewater Treatment Facility
500 Davidson Street
Novato, California

PLATE

8

JOB NUMBER 0337,001.99	REVIEWED BY Cheri Page	DATE September 1999	REVISED	SHEET NO. 1 of 1
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TRACE #147/RG/30Sep99

BORING LOCATION Treatment Plant, 500 Davidson St. (north of former product line leak excavation)			ELEVATION AND DATUM Ground Surface		BORING NO. SB-6
DRILLING AGENCY Clear Heart, LLC		DRILLER BR	DATE STARTED 5 Aug 99		DATE FINISHED 6 Aug 99
DRILLING EQUIPMENT DR 10K Truck-mounted Drill Rig			COMPLETION DEPTH 20.0 ft	SAMPLER CA Modified Split Spoon	
DRILLING METHOD DP to 15.5 ft, 4" SFA to 20 ft		BORING DIA. 4 inches	NO. OF SAMPLES 3 Soil and 1 Grab Groundwater		
SIZE AND TYPE OF CASING —		FROM — TO —	WATER LEVEL —	FIRST Not observed	BEFORE SAMPLE 9.25 ft
TYPE OF PERFORATION —		FROM — TO —	CORE BARREL 1.5 inch ϕ	LENGTH 18 inches	
SIZE AND TYPE OF PACK —		FROM — TO —	LOGGED BY: JC	CHECKED BY: CYP	
TYPE OF SEAL	NO. 1 —	FROM — TO —	COMMENTS Soil samples field screened with Photo-Ionization Detector (PID), results in parts per million (ppm). Drilled with vacuum truck from grade to 4.5 ft because of underground utilities.		
	NO. 2 —	FROM — TO —			

DEPTH (feet)	Samples	Sample ID	PID	Blows	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
					Asphalt-7 inches, Base rock.		
					SILTY SANDY GRAVEL (GM), with debris. [Fill]	GM	
5		6.0	0		SANDY CLAY (CL) with gravel, dark olive gray (5Y 9/2), very moist, 40% clay, 40% fine-grained sand, 20% gravel.	CL	
10		11.0			SILTY SAND (SM), yellowish brown (10YR 5/6), damp, dense, 70% fine- to medium-grained sand, 30% silt.	SM	
15		16.0			Light olive brown (2.5Y 4/5) with orange mottling, damp.		
20					SILTY SANDSTONE, light gray (2.5Y 9/2), dry, indurated. [Bedrock]	Silty Sandstone	
					TD: 20.0 ft bgs Note: Temporary well screen inserted from 5 to 20 ft bgs. Water sample SB-6(w) collected on 6 Aug 99; DTW - 9.25 ft bgs.		

(TRACE #147/RG/30Sep99)

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LOG OF SOIL BORING SB-6
Novato Water District
Wastewater Treatment Facility
500 Davidson Street
Novato, California

PLATE

9

JOB NUMBER 0337,001.99	REVIEWED BY Cheri Page	DATE September 1999	REVISED	SHEET NO. 1 of 1
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BORING LOCATION Treatment Plant, 500 Davidson St. (next to former dispenser island)				ELEVATION AND DATUM Ground Surface		BORING NO. SB-7	
DRILLING AGENCY Clear Heart, LLC		DRILLER BR		DATE STARTED 5 Aug 99		DATE FINISHED 6 Aug 99	
DRILLING EQUIPMENT DR 10K Truck-mounted Drill Rig				COMPLETION DEPTH 14.0 ft		SAMPLER CA Modified Split Spoon	
DRILLING METHOD DP to 14 ft, overdrill with SFA		BORING DIA. 4 inches		NO. OF SAMPLES 3 Soil and 1 Grab Groundwater			
SIZE AND TYPE OF CASING —		FROM — TO —		WATER LEVEL FIRST 8.0 ft		BEFORE SAMPLE 10.5 ft	
TYPE OF PERFORATION —		FROM — TO —		CORE BARREL 1.5 inch ϕ		LENGTH 18 or 24 in.	
SIZE AND TYPE OF PACK —		FROM — TO —		LOGGED BY: JC		CHECKED BY: CYP	
TYPE OF SEAL		NO. 1 —		FROM — TO —		COMMENTS Soil samples field screened with Photo-Ionization Detector (PID), results in parts per million (ppm).	
		NO. 2 —		FROM — TO —			

DEPTH (feet)	Samples	Sample ID	PID	Blows	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
0					Concrete (9.5 inches).		
5		6.5		0	SANDY CLAY (CL) brown (10YR 4/3), moist, 60% clay, 40% fine- to medium-grained sand.	CL	
					Yellowish brown (10YR 5/6) with orange mottling.		
10		11.0		0	GRAVELLY SILTY SAND (SM), brown (10YR 5/3), wet, 60% fine- to coarse-grained sand, 20% silt, 20% gravel.	SM	
				0	SILTY SANDSTONE (very hard material). [Bedrock]	Silty Sandstone	
15					TD: 14.0 ft bgs Note: Temporary well screen inserted from 4 to 14 ft bgs. Groundwater sample SB-7(w) collected on 6 Aug 99; DTW - 10.5 ft bgs.		
20							

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LOG OF SOIL BORING SB-7
Novato Water District
Wastewater Treatment Facility
500 Davidson Street
Novato, California

PLATE

10

JOB NUMBER 0337,001.99	REVIEWED BY Cheri Page	DATE September 1999	REVISED	SHEET NO. 1 of 1
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(TRACE #147/RC/305Sep99)

BORING LOCATION		500 Davidson St., Novato (6' from NW side of garage)		ELEVATION AND DATUM TOC 6.88 ft		BORING NO. MW-1	
DRILLING AGENCY		Clear Heart Drilling, Inc.		DRILLER Pablo		DATE STARTED DATE FINISHED 25 Aug 06 → 25 Aug 06	
DRILLING EQUIPMENT		Deep Rock DR10K Truck-Mounted Rig		COMPLETION WELL DEPTH 20.0 ft		SAMPLER CA Modified Split Spoon	
DRILLING METHOD		Hollow Stem Auger		BORING DIA. 8 inches O.D.		NO. OF SAMPLES 3 Soil	
SIZE AND TYPE OF CASING		Schedule 40 PVC (2")		FROM 0.5 ft TO 20.0 ft		WATER LEVEL FIRST — MEASURED / SAMPLED —	
TYPE OF PERFORATION		Machine Slotted PVC 0.010 inch		FROM 6.0 ft TO 20.0 ft		CORE BARREL 2.0 inch ϕ LENGTH 18 inches	
SIZE AND TYPE OF PACK		#2/12 Sand		FROM 5.0 ft TO 20.0 ft		LOGGED BY: EJVB CHECKED BY: RWE	
TYPE OF SEAL		NO. 1 Bentonite Chips		FROM 3.0 ft TO 5.0 ft		COMMENTS	
		NO. 2 Cement Bentonite Grout		FROM 0.5 ft TO 3.0 ft			

DEPTH (feet)	Samples	Sample ID	Blows	PD (ppm)	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
5		d 5.5	6		SILTY SAND/SANDY SILT (ML/SM) with Gravel, very wet; no odor. [Fill] Hand augered to 5 ft.	Fill	Lock Box Grout Bentonite
10		d 11.0	20		SANDY SILT (ML), black (10YR 2/1) with some greenish gray staining in spots, wet; ~65% silt, ~35% fine-coarse sand, trace gravel up to 1/2"; slight organic odor.	ML	Well Screen Sand
15		d 20.0	50 (3")		SILTY SAND (SM), yellowish-brown (10YR 5/6), moist to wet, harder drilling; ~70% very fine-fine sand, ~20% silt, ~10% clay; no odor.	SM	
20		d 20.0	50 (3")		Bedrock at 13 ft. Cemented Sand and Silt [Bedrock], yellowish-brown and dark yellowish-brown (10YR 5/6 & 4/6), moist, poorly cemented, no odor, very fine to medium grained, recovery insufficient for sampling.	Bedrock	
20					Same as above, except dry to damp, no odor. [Bedrock]		
					TD: 20.25 ft bgs		

(TRACE #419/RG/07Oct06)

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LOG OF MONITORING WELL MW-1

500 Davidson Street
Novato, California

FIGURE

3

JOB NUMBER	0337,001.06	REVIEWED BY	EC&A, E.J. VandenBosch	DATE	September 2006	REVISED	October 2006	SHEET NO. 1 of 1
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BORING LOCATION		500 Davidson St., Novato (20 ft north of diesel AST, ~44 ft west of MW-1)		ELEVATION AND DATUM		TOC 8.10 ft		BORING NO.		MW-2	
DRILLING AGENCY		Clear Heart Drilling, Inc.		DRILLER		Pablo		DATE STARTED		24 Aug 06	
DRILLING EQUIPMENT		Deep Rock DR10K Truck-Mounted Rig		DATE FINISHED		24 Aug 06		SAMPLER		CA Modified Split Spoon	
DRILLING METHOD		Hollow Stem Auger		BORING DIA.		8 inches O.D.		COMPLETION WELL DEPTH		20.0 ft	
SIZE AND TYPE OF CASING		Schedule 40 PVC (2")		NO. OF SAMPLES		3 Soil		WATER LEVEL		FIRST —	
TYPE OF PERFORATION		Machine Slotted PVC 0.010 inch		FROM		0.5 ft TO 20.0 ft		MEASURED / SAMPLED		DTW 19.8 ft	
SIZE AND TYPE OF PACK		#2/12 Sand		FROM		4.0 ft TO 20.0 ft		CORE BARREL		2.0 inch ϕ	
TYPE OF SEAL		NO. 1 Bentonite Chips		FROM		2.5 ft TO 4.0 ft		LOGGED BY:		BLW	
		NO. 2 Portland Cement		FROM		0.5 ft TO 2.5 ft		CHECKED BY:		RWE	
								COMMENTS		Soil samples field screened with Photo-ionization Detector (PID), results in parts per million (ppm).	

DEPTH (feet)	Samples	Sample ID	Blows	PD (ppm)	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
0					Class D baserock fill.	Fill	
5					Hand augered to 5.5 ft.		
6		d6.0	12	0	Clayey Gravel, only 6" of recovery. [Fill]		
10					CLAYEY GRAVEL (GM) with Sand.	GM	
11		d11.0	17	0	Contact at 11 ft: SAND (SP), yellowish-brown (10YR 5/5), moist; poorly graded medium sand (1/4 - 1/2 mm), 30% recovery.	SP	
15					CLAYEY SAND (SC), light brown (10YR ?), damp; clay is 40% of matrix, light material.	SC	
16		d15.0	52	0	Grades to coarse-grained fractured SANDSTONE with very little moisture (material is characteristic of poorly cemented sandstone) [Bedrock]	Sandstone	
20					Coarse grained SANDSTONE, dark yellowish-brown (10YR-4/4), well cemented.		
20.5			50	(5")			
					TD: 20.5 ft bgs		

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LOG OF MONITORING WELL MW-2
500 Davidson Street
Novato, California

FIGURE

4

JOB NUMBER	0337,001.06	REVIEWED BY	EC&A, E.J. VandenBosch	DATE	September 2006	REVISED	October 2006	SHEET NO.	1 of 1
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TRACE #419/RG/07Oct06

BORING LOCATION		500 Davidson St., Novato (-37' northwest of MW-1)		ELEVATION AND DATUM TOC 9.00 ft		BORING NO. MW-3	
DRILLING AGENCY		Clear Heart Drilling, Inc.		DRILLER		Pablo	
DATE STARTED		24 Aug 06		DATE FINISHED		24 Aug 06	
DRILLING EQUIPMENT		Deep Rock DR10K Truck-Mounted Rig		COMPLETION WELL DEPTH		20.0 ft	
SAMPLER		CA Modified Split Spoon		NO. OF SAMPLES		4 Soil	
DRILLING METHOD		Hollow Stem Auger		BORING DIA.		8 inches O.D.	
SIZE AND TYPE OF CASING		Schedule 40 PVC (2")		FROM 0.5 ft TO 20.0 ft		WATER LEVEL FIRST ~ 9 ft bgs	
MEASURED / SAMPLED		—		CORE BARREL		2.0 inch ϕ	
TYPE OF PERFORATION		Machine Slotted PVC 0.010 inch		FROM 6.0 ft TO 20.0 ft		LENGTH 18 inches	
SIZE AND TYPE OF PACK		#2/12 Sand		FROM 5.0 ft TO 20.0 ft		LOGGED BY: BLW	
CHECKED BY: RWE							
TYPE OF SEAL		NO. 1 Bentonite Chips		FROM 3.5 ft TO 5.0 ft		COMMENTS	
		NO. 2 Portland Cement		FROM 0.5 ft TO 3.5 ft			

DEPTH (feet)	Samples	Sample ID	Blows	PD (ppm)	MATERIAL DESCRIPTION	USCS	WELL CONSTRUCTION
5					Baseroack fill.	Fill	
					Hand cleared boring to 5 ft bgs; no obstruction encountered.		
					[Fill]		
10					SANDY SILT (ML), strong organic odor, moderate plasticity. [Bay Mud]	ML	
					Grades to SILTY SAND (SM); yellowish-brown (10YR 5/5); slightly cemented fine to medium sand (1/8-1/2 mm), with lenses of bluish-green silt. [Bay Mud]	SM	
15					SANDSTONE [Bedrock], yellowish-brown (10YR 5/6), dry; poorly cemented, ~20% silt.	Sandstone	
20					SAND [Bedrock], well cemented in some areas; fine to medium sand (1/4-1/2 mm), some silt \leq 10%.		
					TD: 20.5 ft bgs		

(TRACE #419/RG/07/Oc06)

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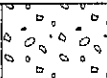
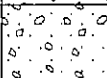
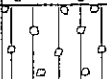

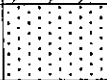

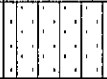
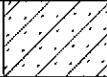

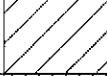


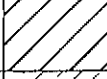
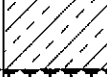

LOG OF MONITORING WELL MW-3
500 Davidson Street
Novato, California

FIGURE

5

JOB NUMBER	0337,001.06	REVIEWED BY	EC&A, E.J. VandenBosch	DATE	September 2006	REVISED	October 2006	SHEET NO.	1 of 1
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UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			TYPICAL NAMES		
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW		WELL GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
			GP		POORLY GRADED GRAVELS WITH OR WITHOUT SAND, LITTLE OR NO FINES
		GRAVELS WITH OVER 15% FINES	GM		SILTY GRAVELS, SILTY GRAVELS WITH SAND
			GC		CLAYEY GRAVELS, CLAYEY GRAVELS WITH SAND
	SANDS MORE THAN HALF COARSE FRACTION IS LESS THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW		WELL GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
			SP		POORLY GRADED SANDS WITH OR WITHOUT GRAVEL, LITTLE OR NO FINES
		SANDS WITH OVER 15% FINES	SM		SILTY SANDS WITH OR WITHOUT GRAVEL
			SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS	ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTS WITH SANDS AND GRAVELS	
		CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, CLAYS WITH SANDS AND GRAVELS, LEAN CLAYS	
		OL		ORGANIC SILTS OR CLAYS OF LOW PLASTICITY	
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%	MH		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOILS, ELASTIC SILTS	
		CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
		OH		ORGANIC SILTS OR CLAYS OF MEDIUM TO HIGH PLASTICITY	
HIGHLY ORGANIC SOILS		PT		PEAT AND OTHER HIGHLY ORGANIC SOILS	



• No Soil Sample Attempted



• Sample Observed but Not Retained



• No Recovery in Sampler



• Sample Submitted for Laboratory Analysis -- Sample Depth is Bottom of Sample



• Blows/Foot: Blows Required to Drive Sampler One Foot Using Hammer Weight of 140 Pounds Falling 30 Inches

2.5 YR 6/2



• Soil Color according to Munsell Soil Color Charts (1975 Edition)

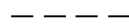


• First Encountered Saturated Soil

• Measured Ground Water Level



• Estimated Boundary Between Lithologic Units



• Estimated Gradational Boundary Between Lithologic Units

TRACE #147/RG/303cp99)

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USCS/LOG SYMBOLS

Novato Water District
Wastewater Treatment Facility
500 Davidson Street
Novato, California

PLATE

12

JOB NUMBER	0337,001.99	REVIEWED BY	John Calomiris	DATE	September 99	REVISED	REVISED
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Appendix D

Site Safety Plan

A. GENERAL INFORMATION

Site Location: Novato Sanitary District Wastewater Treatment Facility (WTF), 500 Davidson Street, Novato, California.

Plan Prepared By: Richard W. Ely Date: May 23, 2007
Richard W. Ely, Senior Geologist

Objective(s): Monitor soil excavation activities and collect soil and groundwater samples.

Background Review: Complete: ☒ Preliminary: ☐

Documentation/Summary: Overall Hazard: Serious: Moderate: Low: ☒
Unknown: ☐

Unusual Features (power lines, terrain, utilities, etc.): Numerous above-ground wastewater treatment tanks and underground piping, utilities and vaults.

STATUS: Active: ☒ Inactive: ☐ Unknown: ☐

HISTORY: (Agency Action, Complaints, Injuries, etc.) On October 8, 1998 a diesel fuel leak was observed in the product line from the 6000-gallon diesel UST to the dispenser. The area was over-excavated, product and groundwater were removed, and an 8-inch-casing-diameter well was installed. TPHd at 5800 mg/kg was detected in soil from the leaking pipe excavation and TPHd at 16,000,000 µg/l was detected in groundwater collected from the excavation. On October 21, 1998, the UST was removed; no evidence of leakage was observed and no fuel hydrocarbons (FHCs) were detected in the soil sample collected from the UST excavation. Extraction well PE-1 was sampled six times between June 8, 2000 and September 23, 2003. TPHd concentrations ranged from 16,000 µg/l (September 8, 2000) to 620,000 µg/l (September 23, 2003). BTEX compounds have not been detected in groundwater water from PE-1. In December 2006, the TPHd concentrations measured in PE-1 were 3000 µg/l. Three groundwater monitoring wells were installed at the site in August 2006. Except for one detection of xylenes at 0.88 µg/l, fuel hydrocarbons have not been reported in the wells..

B. SITE WASTE CHARACTERISTICS

Waste Type(s): Liquid: ☒ (water) Solid: ☒ (soil) Sludge: ☐ Gas: ☐

Characteristic(s): Corrosive: ☐ Ignitable: ☐ Radioactive: ☐ Volatile: ☒
Toxic: ☒ Reactive: ☐ Unknown Other (name): Flammable

Facility Description: Wastewater treatment facility and reclamation pond.

Principle Disposal Method (type and location): Soil from the borings will be stockpiled on and covered with plastic sheeting. Water from equipment decontamination will be placed in DOT 17-H 55-gallon drums. Drummed waste disposal will be based on the results of the investigation.

C. HAZARD EVALUATION

Chemical Name	Description	Threshold Limit Values (TLVs)		Persons Exposed and Potential Routes of Exposure	Symptoms of Acute Exposure	TLV Basis
		8-hr TWA	Short-term Exposure Limit (STEL)			
Benzene	Carcinogen, aromatic HC	0.5 ppm	2.5 ppm	Inhalation, dermal, Ingestion	Headache, dizziness	Cancer
Toluene	Aromatic HC	50 ppm	—	Inhalation, dermal, ingestion	Headache, dizziness	Central nervous system (CNS), irritation
Ethylbenzene	Aromatic HC	100 ppm	125 ppm	Inhalation, dermal, ingestion	Headache, dizziness	Irritation, CNS
Xylenes	Aromatic HC	100 ppm	150 ppm	Inhalation, dermal, ingestion	Headache, dizziness	Irritation
Gasoline	Flammable liquid	300 ppm	500 ppm	Inhalation, dermal, ingestion	Headache, dizziness	Irritation, CNS
Diesel Fuel	Flammable liquid	pending	—	Inhalation, dermal, ingestion	Headache, dizziness, eye/skin irritation	—

D. SITE SAFETY WORKPLAN

Perimeter Establishment: Map/Sketch Attached: X Perimeter Identified: X
Site Secured: X Zone(s) of Contamination Identified: X

Personal Protection:

Level of Protection: A: B: C: D: X

Modifications: Upgrade to level C upon high OVA readings (5 ppm)

Surveillance Equipment and Materials:

Instrument OVA Action Level 5 ppm

SITE PROCEDURES: Observe excavation and collect soil and groundwater samples from the excavation.

HAZARDS: Potential hazards onsite comprise proximity to excavation equipment, exposure to explosive and flammable petroleum vapors and carcinogens.

LEVEL OF PROTECTION: Equipment to protect the body from contact with chemical hazards has been categorized by the Environmental Protection Agency into levels A, B, C, & D. Level A equipment is used when the highest level of protection is needed; Level D equipment is used when minimum protection is needed. The chemical hazard associated with petroleum hydrocarbons is typically low and Level D protection (see equipment list below) is adequate. In case of high levels of contamination, an upgrade to Level C protection equipment may be advised. Level C and D equipment are listed below.

Level C Equipment: NIOSH/MSHA approved air purifying respirator, chemical resistant clothing, chemical resistant inner and outer gloves, chemical resistant boots with steel toe and shank, safety glasses and hard hat.

Level D Equipment: Coveralls, gloves, chemical resistant boots or shoes with steel toe and shank, safety glasses or chemical splash goggles, and hard hat. Tyvex overalls and Solvex or equivalent gloves are recommended.

EQUIPMENT REQUIRED: Normal work clothing may be worn with the following additions:

Excavations: Wear neoprene boots if walking in the excavation or in or around waste soils. Wear a hard hat when near excavation equipment.

Drilling: Wear a hard hat when near the drill rig.

Soil Sampling: Chemical resistant gloves are required when sampling.

Groundwater Sampling: Chemical resistant gloves are required when sampling.

A First Aid Kit and fire extinguisher are also required.

AIR MONITORING: The combustible gas indicator is to be used continuously during all excavation activities. If more than 10 percent of the lower explosive limit (LEL) is measured in the area of the excavation, proceed with caution. If more than 50 percent LEL is measured in the area of the excavation, stop the work or provide ventilation of the area.

A photoionization detector (PID) should be used to monitor the breathing zone during excavation and drilling activities. Readings above 5 ppm are cause for concern. Continuous readings of 5 ppm or greater in the breathing zone requires an upgrade to Level C, including use of half-face respirator with organic vapor cartridges. Continuous readings of 50 ppm or greater in the breathing zone requires stopping the work.

DECONTAMINATION PROCEDURES:

Personal: Remove gloves, wash hands; clean boots in decontamination area.

Equipment: Steam cleaning of all excavation and drilling equipment in the decontamination area. TSP wash of sampler between samples.

FIRST AID: Consultant's vehicle has a first aid kit.

WORK LIMITATIONS (time of day, weather, heat/cold, stress): None

INVESTIGATION-DERIVED MATERIAL DISPOSAL: Soil and groundwater - to be determined based on analytical results; decontamination solutions - store in 55-gallon drums; protective clothing - drums, except boots.

E. EMERGENCY INFORMATION

LOCAL RESOURCES:

Ambulance: 911

Hospital Emergency Room: Novato Community Hospital
180 Rowland Way
Novato, CA.
(415) 209-1300

Poison Control Center: 911

Police: 911

Fire Department: 911

Explosives Unit: 911

Agency Contact: John Jang, San Francisco Bay Regional Water Quality Control
Board
(510) 286-1255

SITE RESOURCES:

Water Supply: Onsite

Telephone: Onsite

Radio: None

Other:

EMERGENCY CONTACT:

Name: Mr. Steve Krautheim

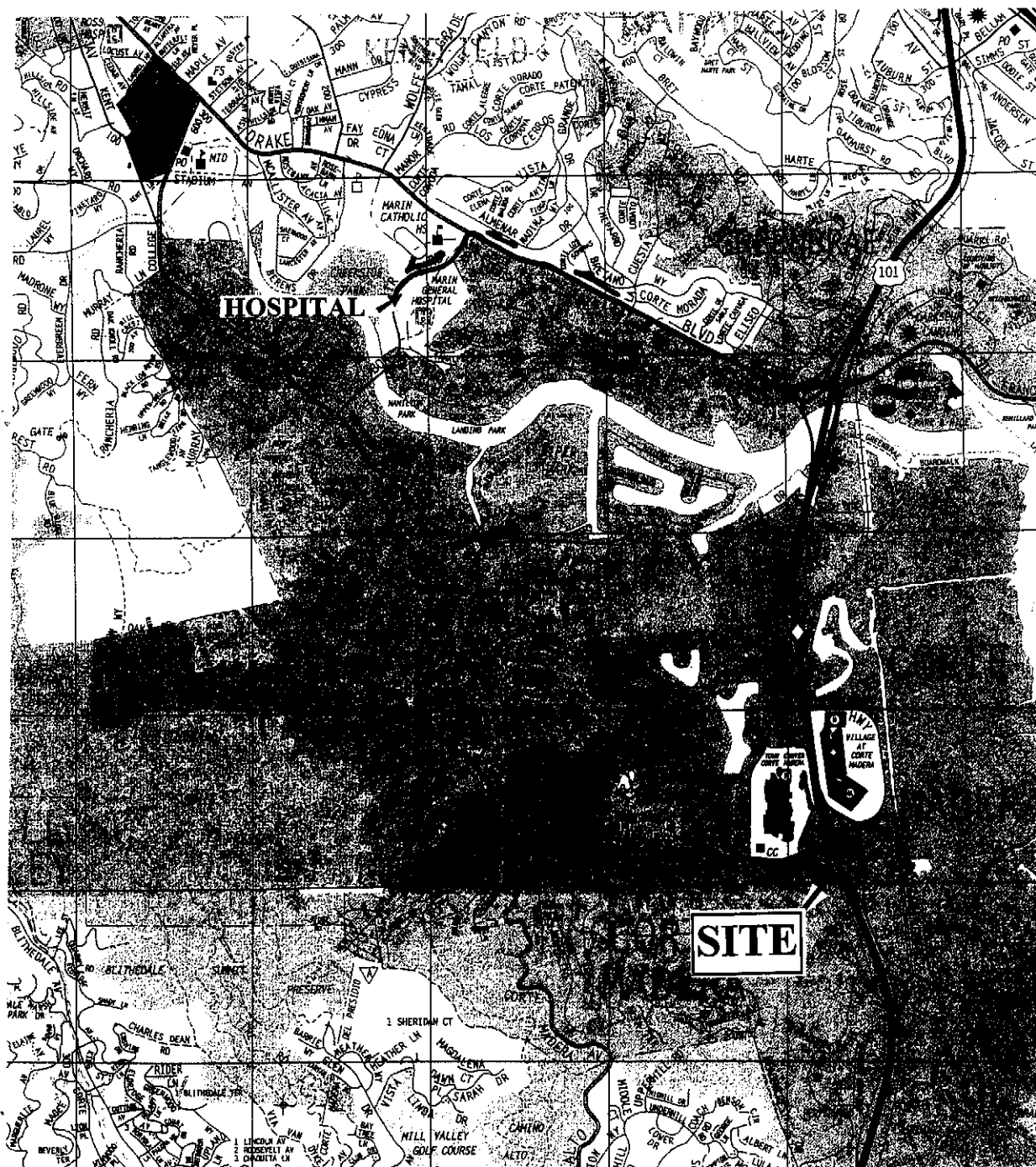
Phone: (415) 892-1694

EMERGENCY ROUTE: Travel northwest on Davidson toward Louis Dr and turn left onto De Long Ave. Merge onto Hwy. 101 south and take the Rowland Blvd exit. Turn left onto Rowland Blvd and then left onto Rowland Way. The hospital is on the left.

SITE SKETCH: (Work zones, command post, etc.): See Workplan

Signature

Date



Detail Map Scale
1 Inch to 2400 Feet



EDD CLARK & ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS

Hospital Location Map
Marin General Hospital
250 Bon Air Road
Greenbrae, California

PLATE
H

JOB NUMBER
0391,001.00

REVIEWED BY:
Lori Brown

DATE:
October 2002

REVISED DATE:
April 2003